

Kerala Gazette No. 38 dated 28th September 2010.

#### **PART IV**

### **COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY**

#### **NOTIFICATIONS**

(1)

No. Conf. II/2941/1/08 (1).

*4th December 2008.*

In exercise of the powers conferred by Section 24 (ii) read with Section 42 (1) of the CUSAT Act 1986, (Act 31 of 1986) the Academic Council at its meeting held on 26-3-2008 has resolved to approve the following:

1. Modified the Scheme of Examination for M.Sc. Degree Course in Statistics as in Appendix-I [ Item No. I (b) (2) of the Academic Council Minutes] and is made effective from 2008 admissions.
2. Modified the Scheme of Examination for M.Sc. Degree Course in Physics as in Appendix-II [Item No. I (b) (3) (a) of the Academic Council Minutes] and is made effective from 2008 admissions.
3. Introduced a new Elective Paper in M.Sc. Degree Course in Physics - “Numerical Methods and Applied Computational Techniques” [Item No. I (b) (3) (c) of the Academic Council Minutes].
4. Modified Course Structure of M.Sc. Applied Chemistry as in Appendix-III [Item No. I (b) (4) (a) of Academic Council Minutes] and made effective from 2008 admissions.
5. Credits of following Papers in M.Sc. Applied Chemistry have been changed with effect from 2008 admissions [Item No. I (b) (4) (2) of the Academic Council].
  - (i) The four credit courses CHE-2103 Organic Chemistry (I) (Structure and Reactivity) and CHE-2203 Organic Chemistry-II (Reactions and Mechanisms) changed to 3 credit courses.
  - (ii) Introduced a two credit course “CHE 2207 Synthetic Organic Chemistry (core) instead of Viva Voce. The course code of Viva Voce becomes CHE - 2208.
  - (iii) CHE - 2303 Organic Chemistry-II replaced by another Elective Paper Chemistry of Natural Products - 4 credits.
  - (iv) Course 2302 Spectroscopy which was a four credit course, is divided into Part-A and Part- B, now replaced by two credit courses CHE-2302 Spectroscopy-I and CHE-2312 Spectroscopy-II. Further CHE-2305 Industries Based on Fermentation replaced by new Elective Paper “Microbial Technology”.
6. The title of the paper “MP-302 Analytical Chemistry and Chemical Instrumentation” offered for M.Phil. Chemistry is changed to “Chemical Instrumentation” and also a new Elective Paper “MP 314 Advanced Photochemistry and Photochemical Technology introduced, these are made effective from 2008 admissions.  
[Item 1(b) (4) (b) of the Academic Council Minutes].
7. The revised Scheme of Examination for M.Tech. Degree in Industrial Catalysis made effective from 2008 admissions (Appendix IV)  
[Item No. I (b) (4) (c) of the Academic Council Minutes].
8. Replaced the present M.Sc. Programme in “Operations Research and Computer Applications to “Operations Research” and the course structure of M.Sc. Operation Research approved as in Appendix -V.  
[Item No. I (b) 5 (c) of the Academic Council Minutes] this made effective from 20-9-2008, date of the meeting of the Syndicate.

The Syndicate at its meeting held on 20-9-2008 vide item 534.29 resolved to approve the above decision taken by the Academic Council.

## APPENDIX—I

M. Sc. (STATISTICS)—COURSE STRUCTURE  
(With effect from 2008 Admission onwards)

**Objectives**

The present course is intended to provide a platform for talented students to undergo higher studies in the subject as well as to train them to suit for the needs of the society. Apart from teaching core Statistics subjects, the students are also trained to handle real life problems through the practical classes. As a part of the course the students are taught some programming languages and also exposed to various statistical softwares such as SPSS, MATLAB, SAS etc.

**Eligibility**

B.Sc. degree in Mathematics or Statistics main with at least 55% marks for the optional subjects taken together.

Duration of the Course	—	Four Semesters
Examination	—	Credit and Semester
Intake	—	20

<i>Course Code</i>	<i>Title of Paper</i>	<i>Core/ Elective</i>	<i>Credits</i>	<i>Contact Hours/ Week</i>	<i>Continuous Evaluation Marks</i>	<i>External Evaluation Marks</i>	<i>Total Marks</i>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Semester—I</b>							
STA 2101	Mathematical Methods for Statistics	C	4	5	50	50	100
STA 2102	Probability Theory I	C	4	5	50	50	100
STA 2103	Probability Distributions	C	4	5	50	50	100
STA 2104	Sampling Theory	C	4	5	50	50	100
STA 2105	Elective I	E	4	5	50	50	100
<b>Semester—II</b>							
STA 2201	Statistical Inference I	C	4	5	50	50	100
STA 2202	Probability Theory II	C	4	5	50	50	100
STA 2203	Stochastic Processes	C	4	5	50	50	100
STA 2204	Practical-I using SPSS	C	2	3	100	..	100
STA 2205	Elective II	E	4	5	50	50	100

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Semester—III</b>							
STA 2301	Statistical Inference II	C	4	5	50	50	100
STA 2302	Multivariate Analysis	C	4	5	50	50	100
STA 2303	Applied Regression Analysis	C	4	5	50	50	100
STA 2304	Practical- II using MATLAB	C	2	3	100	..	100
STA 2305	Elective III	E	4	5	50	50	100
<b>Semester—IV</b>							
STA 2401	Design & Analysis of Experiments	C	4	5	50	50	100
STA 2402	Statistical Quality Assurance	C	4	5	50	50	100
STA 2403	Practical— III using SAS Package and Comprehensive Viva Voce	C	4	3	50	50	100
STA 2404	Elective IV	E	4	5	50	50	100
STA 2405	Elective V	E	4	5	50	50	100

*Note:*—The comprehensive viva in STA 2403 is to be conducted externally with at least two external examiners (50 marks). Practical III is to be evaluated internally (50 marks).

#### LIST OF ELECTIVES

1. Statistical Computing
2. Actuarial Statistics
3. Advanced Distribution Theory
4. Advanced Probability Theory
5. Advanced Stochastic Processes
6. Bayesian Inference and Decision
7. Demographic Techniques
8. Directional Data Analysis
9. Inference for Stochastic Processes
10. Multivariate Methods
11. Operations Research
12. Reliability Modelling and Analysis
13. Statistical Forecasting
14. Statistical Genetics
15. Survival Analysis
16. Time Series Analysis

SCHEME OF EXAMINATIONS AND SYLLABUS FOR M. Sc. PHYSICS  
(From 2008 Admission onwards)

<i>Course code</i>	<i>Name</i>	<i>C/E</i>	<i>Marks Distribution</i>			<i>Credit</i>
			<i>Internal</i>	<i>External</i>	<i>Total</i>	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester—I</b>						
Physics 2101	Mathematical Physics	C	50	50	100	4
Physics 2102	Classical Mechanics	C	50	50	100	4
Physics 2103	Basic Solid State Physics	C	50	50	100	4
Physics 2104	Basic Electronics	C	50	50	100	4
Physics 2105	Experiments in General Physics	C	50	..	50	2
Total			250	200	450	18
<b>Semester—II</b>						
Physics 2201	Quantum Mechanics—I	C	50	50	100	4
Physics 2202	Statistical Physics	C	50	50	100	4
Physics 2203	Electrodynamics	C	50	50	100	4
Physics 2204	Lasers and Atomic and Molecular Spectroscopy	C	50	50	100	4
Physics 2205	Experiments in General Physics	C	50	..	50	2
Total			250	200	450	18
<b>Semester—III</b>						
Physics 2301	Quantum Mechanics—II	C	50	50	100	4
Physics 2302	Nuclear and Particle Physics	C	50	50	100	4
Physics 2303	Relativity and Astrophysics	C	50	50	100	4
Physics 2304	Advanced Practical (Lab. Course)	C	50	..	50	2
	Elective-I	E	50	50	100	4
Total			250	200	450	18

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester—IV</b>						
Physics 2401	Project	C	100	..	100	4
	Elective II	E	50	50	100	4
	Elective III	E	50	50	100	4
	Elective IV	E	50	50	100	4
Physics 2430	Elective V (Advanced Practical)	E	100	..	100	4
Total			350	150	500	20

## ELECTIVE PAPERS

Course No.	Name	C/E	Marks Distribution			
			Internal	External	Total	Credit
(1)	(2)	(3)	(4)	(5)	(6)	(7)
05	Solid State Physics-I	E	50	50	100	4
06	Solid State Physics-II	E	50	50	100	4
07	Electronics-I	E	50	50	100	4
08	Electronics-II	E	50	50	100	4
09	Industrial Physics-I	E	50	50	100	4
10	Industrial Physics-II	E	50	50	100	4
11	Quantum Electronics	E	50	50	100	4
12	Optoelectronics	E	50	50	100	4
13	Advanced Mathematical Physics	E	50	50	100	4
14	Nonlinear Dynamics and Chaos	E	50	50	100	4
15	Quantum Field Theory	E	50	50	100	4
16	Solar Cells	E	50	50	100	4
17	Modern Optics	E	50	50	100	4
18	Thin Film Physics	E	50	50	100	4
19	Solid State Devices and Applications	E	50	50	100	4
20	Physics of Nanostructured Materials	E	50	50	100	4
21	Quantum Computation and Information	E	50	50	100	4
22	Advanced Magnetism and Magnetic Materials	E	50	50	100	4
23	Molecular Physics and Laser Spectroscopy	E	50	50	100	4
24	Synthesis and Characterization of Materials	E	50	50	100	4
25	Quantum Optics	E	50	50	100	4
26	Nonlinear Optics	E	50	50	100	4
27	Remote Sensing	E	50	50	100	4
28	Digital Signal Processing	E	50	50	100	4
29	Biosensors	E	50	50	100	4
2430	Advanced Practical (Lab Course)	E	100	..	1000	4

Elective course physics 2430 Advanced Practical (Lab Course) will be offered only in semester IV. Other Elective papers will be offered either in semester III or in semester IV. The Course Code for the Elective papers will be assigned at the time the course is offered.

Each theory course consists of lectures of five hours per week. The internal evaluation consists of student seminars, periodic class tests and a viva-voce at the end of the semester.

Each Lab course consists of nine hours per week and duration of practical examination is:

Physics 2105, Physics 2205 and Physics 2304 - 4 hours each

Physics 2430 - 6 hours

Project work has five hours per week. Project report will be evaluated by the supervising guide and another faculty member of the Department nominated by the Departmental Council. Three copies of the project report should be submitted in advance for evaluation. Project evaluation consists of a Viva-Voce examination also.

Elective papers of the revised syllabus can be offered to M.Sc. Students admitted in 2007.

### APPENDIX—III

#### COURSE STRUCTURE AND SYLLABI OF THE REVISED/NEWLY INTRODUCED COURSES OF M. Sc. (APPLIED CHEMISTRY)

<i>Course Code</i>	<i>Paper</i>	<i>Core/ Elective</i>	<i>Credits</i>	<i>Contact Hours/ Week</i>	<i>Continuous evaluation Marks</i>	<i>External Evaluation Marks</i>	<i>Total Marks</i>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Semester—I</b>							
CHE 2101	Theoretical Chemistry	C	4	4	50	50	100
CHE 2102	Inorganic Chemistry-I	C	4	4	50	50	100
CHE 2103	Organic Chemistry-I (Structure and reactivity)	C	3	3	50	50	100
CHE 2104	Physical Chemistry-I	C	4	4	50	50	100
CHE 2105	Organic Chemistry (Practicals)	C	2	5	50	50	100
CHE 2106	Inorganic Chemistry (Practicals)	C	2	5	50	50	100
CHE 2107	Viva-Voce						
<b>Semester—II</b>							
CHE 2201	Analitical Chemistry	C	4	4	50	50	100
CHE 2202	Inorganic Chemistry-II	C	4	4	50	50	100
CHE 2203	Organic Chemistry-II (Reactions and Mechanisms)	C	3	3	50	50	100
CHE 2204	Physical Chemistry-II	C	4	4	50	50	100

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CHE 2205	Analytical Chemistry (Practicals)	C	2	5	50	50	100
CHE 2206	Physical Chemistry (Practicals)	C	2	5	50	50	100
CHE 2207	Synthetic Organic Chemistry	C	2	2	50	50	100
CHE 2208	Viva-Voce						
<b>Semester—III</b>							
CHE 2301	Instrumental Methods of Analysis	C	4	4	50	50	100
CHE 2302	Spectroscopy-I	E	2	2	50	50	100
CHE 2303	Chemistry of Natural Products	E	4	4	50	50	100
CHE 2304	Green Chemistry	E	4	4	50	50	100
CHE 2305	Microbial Technology	E	4	4	50	50	100
CHE 2306	Industrial Catalysis	E	4	4	50	50	100
CHE 2307	Polymers: Chemistry of Modern Materials	E	4	4	50	50	100
CHE 2308	Instrumental Methods of Analysis (Practicals)	E	2	5	50	50	100
CHE 2309	Drugs : Natural and Synthetic	E	4	4	50	50	100
CHE 2310	Chemistry of Perfumes and Flavours	E	4	4	50	50	100
CHE 2311	Bioinorganic Chemistry	E	4	4	50	50	100
CHE 2312	Spectroscopy-II	E	2	2	50	50	100
<b>Semester—IV</b>							
<i>Course Code</i>	<i>Paper</i>	<i>C/E</i>	<i>Credits</i>	<i>Faculty</i>	<i>Pre requisites</i>		
CHE 2401	Dissertation	C	16	..	The Project work, extending to the whole Semester, is carried out at National R & D Laboratories		
CHE 2402	Viva-Voce	C	..	..	..		

## APPENDIX—IV

## SYLLABI AND COURSE STRUCTURE OF M. TECH. DEGREE COURSE IN INDUSTRIAL CATALYSIS

<i>Course code</i>	<i>Paper</i>	<i>Credit</i>	<i>C/E</i>	<i>Marks</i>		<i>Total Marks</i>
				<i>Tests and Assignments</i>	<i>End Sem Exam</i>	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester—I</b>						
CHE 3101	Adsorption and Catalysis	4	C	60	40	100
CHE 3102	Catalyst Technology-I	4	C	60	40	100
CHE 3103	Physical Methods In Catalysis-I	4	C	60	40	100
CHE 3104	Chemical Reaction Engineering	3	E	60	40	100
CHE 3105	Enzyme Catalysis	3	E	60	40	100
CHE 3106	Electrocatalysis	3	E	60	40	100
CHE 3107	Lab Course	2	C	100	..	100
CHE 3108	Viva-Voce (End Semester)	..	C	..	50	50
<b>Semester—II</b>						
CHE 3201	Physical Methods in Catalysis-II	4	C	60	40	100
CHE 3202	Catalysis by Metal Complexes	4	C	60	40	100
CHE 3203	Catalyst Technology-II	4	C	60	40	100
CHE 3204	Industrial Catalytic Processes	3	E	60	40	100
CHE 3205	Phase Transfer Catalysis	3	E	60	40	100
CHE 3206	Polymer Supported Catalysis	3	E	60	40	100
CHE 3207	Lab Course	2	C	100	..	100
CHE 3208	Viva-Voce (End Semester)	..	C	..	50	50
<b>Semester—III</b>						
CHE 3301	Project Progress Evaluation	16		C		300
<b>Semester—IV</b>						
CHE 3401	Project Dissertation Evaluation and Viva-Voce	16		C		300



APPENDIX—V  
M. Sc. (OPERATIONS RESEARCH)  
Course Structure  
CREDIT SYSEYEM

<i>Course Code</i>	<i>Course Title</i>	<i>Internal</i>	<i>External</i>	<i>Credit</i>
(1)	(2)	(3)	(4)	(5)
<b>Semester—I</b>				
MAO 2101	Linear Algebra	50	50	4×5=20
MAO 2102	Linear Programming	50	50	
MAO 2103	Real Analysis	50	50	
MAO 2104	Probability and Statistics	50	50	
MAO 2105	Numerical Analysis and Computer Programming (FOR TRAN C)	50	50	
Total		250	250	
<b>Semester—II</b>				
MAO 2201	Linear Programming II	50	50	4×5=20
MAO 2202	Stochastic Modelling	50	50	
MAO 2203	Theory of Games	50	50	
MAO 2204	Discrete Mathematics	50	50	
MAO 2205	Computer Networks and its Performance Analysis	50	50	
Total		250	250	
<b>Semester—III</b>				
MAO 2301	Mathematical Modelling of Simulation	50	50	4+(3×4)=16
MAO 2302	Nonlinear and Dynamic Programming	50	50	
MAO 2303	Operations Management	50	50	
MAO 2204	Stochastic Processes	50	50	
	Elective	50	50	
Total		250	250	
<b>Semester—IV</b>				
	Project Report	100	100	16
	Viva Voce	50	50	
Total		150	150	
<b>ELECTIVES</b>				
MAO 2305	Data Structures and Algorithms			
MAO 2306	Data Mining			
MAO 2307	Combinatorial Optimization			
MAO 2308	Coding Theory and Cryptography			
MAO 2309	Mathematical Finance			

In exercise of the powers conferred by Section 24(ii) read with Section 42(1) of the CUSAT Act 1986 (Act 31 of 1986) the Academic Council at its meeting held on 26-3-2008 has resolved to approve the following:

1. Revised the Regulation for the Master of Engineering (By Research) and further resolved not to offer the course from next year onwards. Appendix I  
[Item I(c) (2) of the Academic Council Minutes]
2. The Scheme of Examinations for 5 to 8 Semesters of B.Tech. Engineering Course (all 9 branches) approved with effect from 2006 admissions, as in Appendix II  
[Item No.I (c) (4) of the Academic Council Minutes]
3. The Scheme of Examinations of B.Tech course in Food Technology as in Appendix III made effective from 20-9-2008 the date of the meeting of Syndicate.  
[Item No.I (c) (5) of the Academic Council Minutes]

The Syndicate at its meeting held on 20-9-2008 vide item 534.29 approved the above resolutions taken by the Academic Council.

#### APPENDIX—I

#### REGULATIONS FOR MASTER OF ENGINEERING (BY RESEARCH) PROGRAMME

The Master of Engineering (by research) programme [M.E. (by research) programme] shall be offered in all the departments/divisions of the university coming under the Faculty of Engineering.

1. Admission of the students to the M.E. (by research) programme :
  - (i) A candidate who wishes to pursue a programme of study and research leading to the Degree of Master of Engineering (by research) of the Cochin University of Science and Technology will be required to seek registration to the programme under these regulations as a full time or a part time research student.
  - (ii) Candidates who are working in research projects relevant to the research topic which have been taken up by a School/Department of the university funded internally or by external funding agencies will be deemed to be full time student if they are admitted to the M.E. (by research) programme.
  - (iii) Candidates who are applying for registration as part time students shall be considered for registration only in the cases where the research committee is convinced that effective supervision can be ensured.
2. Eligibility for admission to the M. E. programme :
  - (i) Candidate seeking registration to M. E. programme shall hold a Bachelors Degree in Engineering/Technology from a recognized University with 60% of marks in the qualifying examination provided that candidates belonging to SC/ST communities shall be eligible for concession up to 5 percent.
  - (ii) Candidate shall have passed with 50 percent marks the departmental admission test conducted by the university through the School/Department/Division concerned, which consists of a paper carrying a maximum of 100 marks.
  - (iii) Candidates who have qualified in GATE are exempted from the departmental admission test. However, if such candidates wish to appear in departmental test, they have the freedom to do so. In such cases, better score of the two shall be considered.
3. Procedure for applying for admission :
  - (i) Candidate seeking registration to the M. E. programme as a full time or part time student may do so by submitting their applications in the prescribed form in response to the notification in this respect issued by the university every year.
  - (ii) Application for admission shall be submitted along with consent of the proposed supervising guide to the Head of the School/Department/Division concerned in the prescribed application form and on payment of the prescribed fees.

#### 4. Criteria for admission

##### 4.1 Marks split-up :

For admission to the M. E. (by research) programme, the following marks will be taken into account for ranking the candidates.

- |  |       |
|--|-------|
| (a) Marks obtained in the qualifying examination                   | — 40% |
| (b) Marks obtained in the departmental admission test / GATE score | — 30% |
| (c) Marks for interview  | — 30% |

##### 4.2 Interview for admission :

All candidates who have passed the departmental admission test shall be required to present themselves for an interview before the Research Committee or before a sub-committee appointed by it. The committee shall assess the academic record of the candidate, the research proposal if any made by him/her in the application, the long term plan of academic work to be under taken by the candidate and other related matters.

##### 4.3 Preparation of the Admission List :

- (i) Ranking of the candidates shall be done on the basis of the marks awarded to them as referred to in regulation 4.1 above.
- (ii) Candidates who are teachers in this University or those who have qualified in GATE or those who have been selected for the award of scholarship/fellowship or other similar award by the University, UGC, CSIR or other similar agencies as decided by the Research Committee shall be given priority for admission subject to the other provisions of these regulation or any other regulations of this University.
- (iii) The admission list and the waiting list of all eligible candidates shall be displayed on the notice board of the respective School/Department/Division and shall be valid till the next admission test conducted by the University or for one year whichever is less.

#### 5. Registration

##### 5.1. Procedure :

- (i) A candidate who has been selected for admission may take provisional admission with the Department by paying the required fees in the University Department/University Office and fulfilling such other requirements as per the admission rules.
- (ii) A candidate who wishes to take admission shall do so within one month of the offer of admission provided, however that the Head of the Department shall be empowered to give an extension time for further period upto three months to the candidate if so requested by the candidate and recommended by the research guide.
- (iii) The Head of the Department shall forward to the University a consolidated list of all those who are provisionally admitted to the programme.
- (iv) The University shall give registration to students for the M. E. programme with effect from the date on which he/she was provisionally admitted to the Department.

##### 5.2 Conversion of the registration from full time to part time & vice versa :

A candidate who has registered for research shall be eligible to apply for conversion of the registration from full time to part time & vice versa and the Research Committee shall be empowered to grant request on an application made by the student duly recommended by the research guide and monitoring committee and in such instances of the grant of conversion, the matter may be reported to the University for confirmation. In such conversion the maximum period of the registration will be as in the case of part time students.

##### 5.3 Period of Registration :

- (i) A candidate who is registered as a research student for the M. E. degree as full time student shall normally be eligible to submit his/her thesis for adjudication on completion of two years of registration.
- (ii) A candidate who is registered as a research student for the M.E. degree as part time student shall be eligible to submit his/her thesis for adjudication on completion of three years of registration.

- (iii) A candidate who is registered as full time research student shall normally remain on the rolls of the University for a maximum period of four years after which his/her registration will lapse. The Vice-Chancellor shall be the competent authority to extend the period of registration by a maximum period of one year on the recommendation of the monitoring committee and the research committee.
- (iv) A candidate who has registered as part time research student shall normally remain on the rolls of the University for a maximum period of five years, after which his/her registration will lapse. The Vice-Chancellor shall be the competent authority to extend the period of registration by a maximum period of one year on the recommendation of the monitoring committee and the research committee.
- (v) A candidate ceases to be on the rolls of the University as a research student as soon as his/her vice-voce is over or from the day his/her registration cancelled or lapsed for other reasons.

## 6. Research Guide

### 6.1 Requirements :

Professors/Readers/Lecturers with a Ph.D who have been approved by the University as research guide under the Faculty of Engineering can supervise the work of a candidate carrying out research leading to the M. E. (by research) degree on full time or part time Registration.

### 6.2 Number of Research Scholars with research guide :

The maximum number of research students working with a research guide at a time shall be three.

### 6.3 Joint supervision :

In cases where for valid academic reasons it is felt that the service of an additional supervisor will be desirable, the research committee may recommend a co-guide for joint supervision provided the research student makes a request which is also supported by the main research guide.

In reckoning the maximum number of students who may be registered under a research guide, co-guidance shall not be taken into account.

### 6.4 Change of Research Guide :

The research committee shall have the power to consider the request of the candidate to change his/her guide or to have an additional guide or a co-guide provided that the request of the candidate is supported by the prospective guide and is recommended by the Research Committee. If the research committee decides to give assent to the request, the matter shall be reported to the University for confirmation.

However such request for changes of Guide or for Co-guide shall be made at least six months prior to the candidate giving notice for submission of the thesis for adjudication by examiners provided however that this limitation shall be not be applicable in the case of the death of research guide or in case where the present guide is unable to continue supervision due to reason of health, shifting of residence to a distant place etc.

## 7. Course Work :

A student registering for M.E. (by research) programme will have to complete five courses at M.Tech. level as recommended by the monitoring committee. If any these courses are offered in the M.Tech programmes (full time or part time) run by the concerned School/Department/Division, the student may be permitted to attend those courses. If the courses prescribed by the monitoring committee are not offered at M.Tech level, the monitoring committee may prepare the syllabus of the courses and evaluation may be conducted as in the case of M.Tech. programmes. .

The course work shall preferably be completed in the first two semesters and the existing examination pattern for M.Tech. courses shall be followed. The candidate needs to earn a minimum of fifteen credits from the five courses and a minimum cumulative grade point average (CGPA) of 7.0 should be obtained by the candidate.

## 8. Research Committee :

The research committee constituted in the department for the purpose doctoral research shall perform the function of the research committee for M.E. (by research) also.

9. Monitoring Committee :

- (i) There shall be a monitoring committee to monitor the progress of each student registered for research in the university department.
- (ii) The Head of the department concerned in consultation with the research guide shall constitute the monitoring committee with the research guide as the convenor, the co-guide, if any and another recognized research guide from the same or allied field from the University as members.
- (iii) The monitoring committee shall be in existence during the full period of registration of the candidate with such changes in membership as may become necessary from time to time.
- (iv) The monitoring committee shall assess the progress of the work of the student at each stage and shall make recommendations on matters such as the conversion of registration from full time to part time or vice versa, advising the university regarding any changes in the maximum or minimum period of registration of the candidate, and preparation of a panel of examiners when candidates is ready to submit the thesis for adjudication.
- (v) The monitoring committee shall be competent to recommend to the university any action including cancellation of registration in case of unsatisfactory progress, gross indiscipline or misconduct of the student.

10. Payment of fees :

- (i) Every candidate registered as a research student for the M. E. degree shall be required to pay, in time, such fee as may be prescribed by the university up to and including the month he/she submits the thesis failing which his/her name shall stand removed from the rolls if the default is for more than 30 days after the due date.
- (ii) Within a period of 30 days from the date of removal from the rolls, the candidate may be re-admitted by the Head of the Department on application made by the candidate duly recommended by the research guide and on payment of all arrear fee, re-admission fee and fine as the University may be prescribe from time to time.
- (iii) In case of default in payment of the fees exceeds 30 days and the candidate has failed to apply for re-admission within the next 30 days he/she will be required to apply for re-registration which shall be placed for consideration before the research committee and the research committee shall be competent to take an appropriate decision to re-register the candidate or not.
- (iv) Only after getting the attendance certificate from the research guide duly recommended by the Head of the Department shall the fee be accepted.

11. Attendance :

- (i) Notwithstanding anything contained in the regulations, candidates who come under the UGC/CSIR/GATE Fellowships or schemes/projects etc. shall be governed by the respective rules governing the award of such fellowships/schemes/projects regarding attendance, leave etc.
- (ii) A student registered as a full time research student will be required to maintain at least 80% attendance in every semester failing which his/her name shall be removed from the roll of the University subject to the provisions under sub-clauses (iv), (v) and (vi) below.
- (iii) A candidate who is registered as part time student shall be in attendance at the department for a minimum period of 60 days during in an academic year.
- (iv) The candidates who undertake industry related projects shall spend a minimum period of four weeks in the industry concerned as recommended by the monitoring committee.
- (v) The monitoring committee of the candidate shall, however, be empowered to condone the attendance requirement stipulated in (ii) and (iii) above up to 10 per cent on an application made by the student, detailing the reason for default in attendance and duly recommended by the research guide.

- (vi) A candidate registered as a research student will be eligible to attend conferences or seminars connected with their area of research or participate in research cruises or visit places for collection of data, and such days of travel, shall count for attendance or for periods of being in residence of the University if they have been duly authorized to do so by the research guide.
- (vii) Notwithstanding anything contained in the regulations regarding attendance, a candidate registered for full time research shall be eligible to avail of leave for 30 days in one calendar year and maternity leave as per University Rules without fellowships for three months on medical grounds or for any other genuine reasons with the consent of Research guide.

12. Progress report :

Every research student shall submit the progress report to the research guide every six months which shall be discussed by the monitoring committee to assess whether the student is making satisfactory progress or not.

13. Evaluation of research :

The student on completion of the research activity shall present a seminar highlighting the methodology and inferences. The seminar shall be attended by all members of the monitoring committee . The student shall have at least one paper accepted for publication in a referred Journal or two papers in reputed conference proceedings before the submission of the thesis.

14. Submission of the thesis for ME (by research) Degree :

Every candidate for the award of the degree of M. E. (by research) shall be required to submit the thesis embodying the results of his/her research findings to the University for adjudication by the examiners.

- (i) The thesis shall be written in English.
- (ii) A candidate proposing to submit the thesis shall inform the University of it, at least 3 months in advance and such intimation shall be accompanied by five copies of the synopsis of the thesis . The synopsis shall not exceed ten typewritten pages, and shall be accompanied by evidence of having paid the required fees prescribed by the University from time to time.
- (iii) Candidate shall submit the thesis only after the expiry of the period of the notice of three months, but within a period of six months provided that after paying the prescribed fees for each case, and on the recommendation of the monitoring committee, the research committee can condone a delay up to a period of six months and the Vice Chancellor up to such further period as considered necessary in exceptional cases, provided further that the candidate shall submit his/her thesis only during the currency of his/her registration.
- (iv) In case were a candidate is unable to submit his thesis within the maximum period of registration including extension provided for under these regulations, the candidate shall be required to take fresh admission on payment of all fee on fulfillment of other requirements except that in the case of such admissions the candidate shall be allowed to submit the thesis only after the expiry of six months after such readmission is granted.
- (v) The candidate shall submit to the university five copies of the thesis, printed or typed clearly in the usual format.
- (vi) A thesis shall be accompanied by the following:
  - (a) A declaration signed by the candidate that the thesis has not previous formed the complete thesis for the award of any degree, diploma associateship, fellowship or other similar title or recognition.
  - (b) A certificate by the research guide (s) to the effect that, to the best of his/her/their knowledge the thesis is a record of bonafide research carried out by the student under his/her/their supervision.
  - (c) Any work published by him/her alone or jointly with others in the same area of study as additional evidence of the research work done by the candidate.
  - (d) A synoptic bio-data of the candidate.

## 15. Procedure for adjudication of Thesis :

The thesis shall be adjudicated by an external examiner nominated by the Vice Chancellor from the panel of at least five experts, proposed by the Research Guide and approved by the Monitoring Committee.

- (ii) The University shall make arrangements for the conduct of viva-voce examination. The Viva board shall consist of the Head of the concerned department as Chairman, an expert nominated by the Vice-Chancellor from the panel of experts prepared for the adjudication of the thesis and the Research Guide.
- (iii) There shall be an open defence of the thesis by the candidate at which he/she may respond to questions put forward by the audience.
- (iv) The open defence shall be followed by an in camera viva-voce conducted by the Viva board.
- (v) If for some reasons the viva-voce examination cannot be held on the scheduled date, the candidate shall be required to be present for the examination on a subsequent date as intimated to him/her.
- (vi) If in the opinion of the Viva board the candidate has been successful in the viva-voce examination, the board shall finalize a consolidated report and present it to the University recommending the award of the degree. There will not be any classification for the degree diploma.
- (vii) If in the opinion of the Viva board the candidate has not been successful in the viva-voce examination, the candidate shall be given one additional opportunity for the same following the procedure laid down above and payment of prescribed fees and the decision of Viva board at this examination shall be final.
- (viii) If the examiner suggests re submission of the thesis, the candidate may resubmit the thesis incorporating the changes proposed by the examiner after a period of six months and on payment of such fees as may be prescribed by the University from time to time.
- (ix) On re submission, the thesis shall again be sent for adjudication as far as possible to the same examiner who had adjudicated it earlier and if not substitute him/her with a new examiner who have been selected from the same panel but otherwise following the same procedure as was followed earlier.
- (x) The candidate shall get no further chance for the re submission of the thesis and the decision to accept or reject the thesis at this stage shall be final.

## 16. Publication of Thesis :

A candidate who have been awarded the Degree of Master of Engineering (by research) shall be free to publish his/her thesis after incorporating the modifications suggested by the Board of examiners and proper acknowledgement to the University shall be made in the publication.

## 17. These regulations shall be effective from 2006 admissions.

## APPENDIX-III

## B. TECH. DEGREE COURSE IN CIVIL ENGINEERING

## Scheme of Examinations

(2006 Admissions)

## STREAM A

Code No.	Subject	Hrs/week		Int.	Univ.	Total
		L	T/D/P			
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester V</b>						
CE 501A/B	Engineering, Mathematics—IV	4	..	50	100	150
CE 502A/B	Analysis of Structures—I	3	1	50	100	150
CE 503A/B	Design of Structures—I	3	1	50	100	150
CE 504 A/B	Geotechnical Engineering—I	3	1	50	100	150
CE 505 A	Transportation Engineering—I	4	..	50	100	150
CE 506A/B	Construction Engineering & Management—II	4	..	50	100	150
CE 507A	Geotechnical Engineering Lab	..	3	100	..	100
CE 508 A	Transportation Engineering Lab	..	3	100	..	100
Total		21	9	500	600	1100



(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester VI</b>						
CE 601A	Environmental Engineering—I	3	1	50	100	150
CE 602A/B	Analysis of Structures—II	3	1	50	100	150
CE 603 A/B	Design of Structures—II	3	1	50	100	150
CE 604A/B	Geotechnical Engineering—II	3	1	50	100	150
CE 605A	Transportation Engineering—II	4	..	50	100	150
CE 606A/B	Water Resources & Irrigation Engineering	4	..	50	100	150
CE 607 A	CAD in Civil Engineering	..	3	100	..	100
CE 608A	Environmental Engineering Lab	..	3	100	..	100
Total		20	10	500	600	1100
<b>Semester VII</b>						
CE 701A	Environmental Engineering—II	4	..	50	100	150
CE 702A/B	Prestressed Concrete Structures	3	1	50	100	150
CE 703 A/B	Earthquake Engineering	3	1	50	100	150
CE 704A/B	Quantity Surveying and Valuation	3	1	50	100	150
CE 705A/B	Elective—I	3	1	50	100	150
CE 706A	Computer Applications in Civil Engineering	..	3	100	..	100
CE 707A	Construction and Structural Engineering Lab	..	3	100	..	100
CE 708 A/B	Seminar	..	2	50	..	50
CE 709A	Project	..	2	50	..	50
Total		16	14	550	500	1050
<b>Semester VIII</b>						
CE 801 A/B	Architecture & Town Planning	4	..	50	100	150
CE 802 A/B	Construction Safety & Fire Engineering	4	..	50	100	150
CE 803 A/B	Retrofitting and Rehabilitation of Structures	4	..	50	100	150
CE 804 A/B	Elective—II	4	1	50	100	150
CE 805 A	Building Technology and NDT Lab	..	3	100	..	100
CE 806 A	Project	..	10	200	..	200
CE 807 A	Viva Voce	..	..	..	100	100
Total		16	14	500	500	1000
Grand Total					8000	

*Elective—I*

- 705 (a) Finite Element Method  
 (b) Advanced Construction Techniques & Field Quality Control

*Techniques :*

- (c) Advanced Foundation Engineering  
 (d) Groundwater Engineering  
 (e) Highway & Airfield Pavement Design

*Elective—II*

- 804 (a) Bridge Engineering  
 (b) Cost Effectives Building

- (c) Ground Improvement Techniques  
 (d) Remote Sensing and GIS  
 (e) Industrial Waste Engineering & Management.



## STREAM B

Code No.	Subject	Hrs./week		Int.	Univ.	Total
		L	T/D/P			
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester V</b>						
CE 501A/B	Engineering Mathematics-IV	4	..	50	100	150
CE 502A/B	Analysis of Structure-I	3	1	50	100	150
CE 503A/B	Design of Structures-I	3	1	50	100	150
CE 504A/B	Geotechnical Engineering-I	3	1	50	100	150
CE 505 B	Transportation Engineering	4	..	50	100	150
CE 506A/B	Construction Engineering Management-II	4	..	50	100	150
CE 507 B	Geotechnical Engineering Lab	..	3	75	..	75
CE 508 B	Transportation Engineering Lab	..	3	75	..	75
CE 509 B	Industrial/Field Training	..	6	75	..	75
Total		21	15	525	600	1125
<b>Semester VI</b>						
CE 601B	Environmental Engineering	3	1	50	100	150
CE 602A/B	Analysis of Structure-II	3	1	50	100	150
CE 603 A/B	Design of Structures-II	3	1	50	100	150
CE 604 A/B	Geotechnical Engineering-II	3	1	50	100	150
CE 605 B	MIS & Finance Management	4	..	50	100	150
CE 606 A/B	Water Resources & Irrigation Engineering	4	..	50	100	150
CE 607 B	CAD in Civil Engineering	..	3	75	..	75
CE 608 B	Environmental Engineering Lab	..	3	75	..	75
CE 609 B	Industrial/Field Training	..	6	75	..	75
Total		20	16	525	600	1125

## B. TECH. COMPUTER SCIENCE &amp; ENGINEERING

## Scheme for V to VIII Semesters

(2006 Admissions)

Course Code	Subject Name	Hrs./week		Marks		
		L	T/D/P	Int.	Univ.	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester V</b>						
CE/CS/EB/EC/EE/ E1/IT/ME/SE 501	Engineering Mathematics-IV	4	..	50	100	150
CS/IT 502	Systems Programming	4	..	50	100	150
CS/IT 503	Software Engineering	4	..	50	100	150
CS 504	Computer Graphics	4	..	50	100	150
CS/IT 505	Database Management System	4	..	50	100	150
CS/EB 506	Microprocessor based System Design	4	..	50	100	150
CS/EB/EC/E1 507	Microprocessor Lab	..	3	100	..	100
CS 508	Computer Graphics Lab	..	3	100	..	100
Total		24	6	500	600	1100

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester VI</b>						
CS 601	Compiler Construction	4	..	50	100	150
CS/EE 602	Digital Signal Processing	4	..	50	100	150
CS/IT 603	Operating Systems	4	..	50	100	150
CS/IT 604	Analysis and Design of Algorithms	4	..	50	100	150
CS/EB/EC/EI 605	Control Systems Engineering	4	..	50	100	150
CS/IT 606	Computer Networks	4	..	50	100	150
CS 607	System Programming and Hardware Lab	..	3	100	..	100
CS 608	Mini Project	..	3	100	..	100
Total		24	6	500	600	1100
<b>Semester VII</b>						
CS/EB/EC/EE/EI/ IT 701	Industrial Organization & Management	4	..	50	100	150
CS 702	Advanced Architecture and Parallel Processing	4	..	50	100	150
CS/IT 703	Advanced Computer Networks	4	..	50	100	150
CS/IT 704	Distributed Computing	4	..	50	100	150
CS 705	Elective-I	4	..	50	100	150
CS 706	Language Processor Lab	..	3	100	..	100
CS 707	Network and Operating Systems Lab	..	3	100	..	100
CS 708	Seminar	..	2	50	..	50
CS 709	Project Design	..	2	50	..	50
Total		20	10	550	500	1050
<b>ELECTIVE I</b>						
CS 705A—Embedded Systems						
CS/IT 705 B—Information Retrieval						
CS/EB/IT 705 C—Artificial Neural Networks						
CS 705 D—Web Commerce Technologies						
<b>Semester VIII</b>						
CS 801	Security in Computing	4	..	50	100	150
CS 802	Artificial Intelligence	4	..	50	100	150
CS 803	Object Oriented Modeling & Design	4	..	50	100	150
CS 804	Elective II	4	..	50	100	150
CS 805	Project Work	..	14	300	..	300
CS 806	Viva-voce	..	..	..	100	100
Total		16	14	500	500	1000
Grand Total				3700	4300	8000

## ELECTIVE II

CS/EC/EE/EI 804 A—Digital Image Processing

CS/EB/EC/IT 804 B—Bioinformatics

CS 804 C—Software Architecture

CS/IT 804 D—Mobile Computing

## B. TECH. DEGREE IN ELECTRONICS AND BIOMEDICAL ENGINEERING

## Scheme for V to VIII Semesters

(2006 Admissions)

Course No.	Subject	Hrs./week		Marks		
		L	T/D/P	Int.	Univ.	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester V</b>						
EB/EC/EE/EI/CE/CS/ IT/ME/SE 501	Engineering, Mathematics—IV	4	..	50	100	150
EB 502	Biomaterials	4	..	50	100	150
EB 503	Hospital Engineering	4	..	50	100	150
EB 504	Biosignal Processing—I	4	..	50	100	150
EB 505	Bioinstrumentation—I	4	..	50	100	150
EB/CS 506	Microprocessor Based System Design	4	..	50	100	150
EB/EC/EI/CS 507	Microprocessor Laboratory	..	3	100	..	100
EB 508	Medical Electronics Laboratory—I	..	3	100	..	100
Total		24	6	500	600	1100
<b>Semester VI</b>						
EB 601	Biosensors and Transducers	4	..	50	100	150
EB 602	Biomechanics	4	..	50	100	150
EB 603	Bioinstrumentation—II	4	..	50	100	150
EB 604	Principles of Object Oriented Programming	4	..	50	100	150
EB/EC/EI/CS 605	Control Systems Engineering	4	..	50	100	150
EB 606	Biosignal Processing—II	4	..	50	100	150
EB 607	Medical Electronics Laboratory—II	..	3	100	..	100
EB 608	Mini Project	..	3	100	..	100
Total		24	6	500	600	1100

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester VII</b>						
EB/EC/EE/EI/CS/ IT 701	Industrial Organization & Management	4	..	50	100	150
EB 702	Therapeutic Equipments	4	..	50	100	150
EB 703	Principles of Radio diagnosis and Radiotherapy	4	..	50	100	150
EB 704	Medical Imaging Techniques	4	..	50	100	150
EB 705	Elective I	4	..	50	100	150
EB 706	Biosignal Processing Laboratory	..	3	100	..	100
EB 707	Bioengineering Laboratory	..	3	100	..	100
EB 708	Seminar	..	2	50	..	50
EB 709	Main Project Design	..	2	50	..	50
Total		20	10	550	500	1050
<b>ELECTIVE I</b>						
EB/EE 705 (A)—Computer Communications						
EB 705 (B)—Biostatistics & Design of Experiments						
EB/CS/IT 705(C)—Artificial Neural Networks						
EB/EC/EI 705 (D)—Mechatronics						
EB 705 (E)—Embedded Systems and Applications						
<b>Semester VIII</b>						
EB 801	Medical Image Processing	4	..	50	100	150
EB 802	Telemedicine	4	..	50	100	150
EB 803	Biophotonics	4	..	50	100	150
EB 804	Elective II	4	..	50	100	150
EB 805	Main Project	..	14	300	..	300
EB 806	Viva-voce	..	..	..	100	100
Total		16	14	500	500	1000
Grand Total				3700	4300	8000

**ELECTIVE II**

EB 804 (A)—Modelling of Physiological Systems

EB/EC/CS/IT 804 (B)—Bioinformatics

EB 804 (C)—Computer Graphics and Volume Visualisation

EB/EE 804 (D)—VLSI Design

EB 804 (E) Bio MEMS &amp; Nanotechnology

## B. TECH. ELECTRONICS &amp; COMMUNICATION ENGINEERING

## Scheme for V to VIII Semesters

(2006 Admissions)

Subject Code	Subject Name	Hrs/week		Marks		
		L	T/D/P	Int.	Univ.	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester V</b>						
CE/CS/EB/EC/EE/EI/IT/ME/SE/501	Engineering Mathematics-IV	4	..	50	100	150
EC 502	Electromagnetic Theory	4	..	50	100	150
EC/EI 503	Digital System Design	4	..	50	100	150
EC/EI 504	Advanced Microprocessors	4	..	50	100	150
EC/EI 505	Micro Electronics & Intergrated Circuits	4	..	50	100	150
EC/EI 506	Digital Signal Processing	4	..	50	100	150
CS/EB/EC/EI 507	Microprocessor Laboratory	..	3	100	..	100
EC 508	Electronics Circuits Laboratory-II	..	3	100	..	100
Total		24	6	500	600	1100
<b>Semester VI</b>						
EC 601	Digital Communication	4	..	50	100	150
EC 602	Microwave Techniques & Devices	4	..	50	100	150
EC/EI 603	VLSI Design	4	..	50	100	150
EC 604	Electronic Measurements and Instrumentation	4	..	50	100	150
CS/EB/EC/EI 605	Control Systems Engineering	4	..	50	100	150
EC/EI 606	Embedded Systems	4	..	50	100	150
EC 607	Communication Laboratory-I	..	3	100	..	100
EC 608	Mini Project	..	3	100	..	100
Total		24	6	500	600	1100
<b>Semester VII</b>						
CS/EB/EC/EE/EI/IT 701	Industrial Organization & Management	4	..	50	100	150
EC 702	Radio Communication	4	..	50	100	150
EC/EI 703	Computer Communication & Networks	4	..	50	100	150
EC 704	Electronic Product Design	4	..	50	100	150
EC 705	Elective I	4	..	50	100	150
EC 706	Signal Processing Laboratory	..	3	100	..	100
EC 707	Communication Laboratory-II	..	3	100	..	100
EC 708	Seminar	..	2	50	..	50
EC 709	Project Design	..	2	50	..	50
Total		20	10	550	500	1050

## ELECTIVE I

EC/EI 705 A—Intelligent Systems

EC 705 B—Fundamentals of RF Design

EC 705 C—Hardware modelling

EB/EC/EI 705 D—Mechatronics

**Semester VIII**

<i>Subject Code</i>	<i>Subject Name</i>	<i>Hrs./week</i>		<i>Marks</i>		
		<i>L</i>	<i>T/D/P</i>	<i>Int.</i>	<i>Univ.</i>	<i>Total</i>
EC 801	Audio & Video Engineering	4	..	50	100	150
EC 802	Communication Systems	4	..	50	100	150
EC 803	Opto Electronics & Communication	4	..	50	100	150
EC 804	Elective II	4	..	50	100	150
EC 805	Project Work	..	14	300	..	300
EC 806	Viva-voce	..	..	..	100	100
Total		16	14	500	500	1000
Grand Total						8000

**ELECTIVE II**

CS/EC/EE/EI 804 A—Digital Image Processing

CS/EB/EC/IT 804 B—Bioinformatics

EC/EI 804 C—ASIC Design

EC 804 D—Mixed Signal System Design

**B. TECH. ELECTRICAL & ELECTRONICS ENGINEERING****Scheme for V to VIII Semesters**

(2006 Admissions)

<i>Subject Code</i>	<i>Subject Name</i>	<i>Hrs/week</i>		<i>Marks</i>		
		<i>L</i>	<i>T/D/P</i>	<i>Int.</i>	<i>Univ.</i>	<i>Total</i>
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester V</b>						
CE/CS/EB/EC/EE/EI/IT/ME/SE501	Engineering Mathematics-IV	4	..	50	100	150
EE 502	Electrical Machines-II	4	..	50	100	150
EE 503	Field Theory	4	..	50	100	150
EE 504	Engineering Material Science	4	..	50	100	150
EE 505	Microprocessor Based Systems	4	..	50	100	150
EE 506	Linear Intergrated Circuits	4	..	50	100	150
EE 507	Electrical Machines-I Lab	..	3	100	..	100
EE 508	Power Electronics Lab	..	3	100	..	100
Total		24	6	500	600	1100

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester VI</b>						
EE 601	Power Systems-I	4	..	50	100	150
CS/EE 602	Digital Signal Processing	4	..	50	100	150
EE 603	Control Systems-I	4	..	50	100	150
EE 604	Electrical Drawing	4	..	50	100	150
EE 605	Modern Communication Engineering	4	..	50	100	150
EE 606	Electrical Machines-III	4	..	50	100	150
EE 607	Microprocessor Lab	..	3	100	..	100
EE 608	Mini Project	..	3	100	..	100
Total		24	6	500	600	1100
<b>Semester VII</b>						
CS/EB/EC/EE/EI/ IT 701	Industrial Organization & Management	4	..	50	100	150
EE 702	Design Estimation & Costing	4	..	50	100	150
EE 703	Power Systems-II	4	..	50	100	150
EE 704	Control Systems-II	4	..	50	100	150
EE 705	Elective-I	4	..	50	100	150
EE 706	Electrical Machines-II Lab	..	3	100	..	100
EE 707	Advanced Electrical Engineering Lab	..	3	100	..	100
EE 708	Seminar	..	2	50	..	50
EE 709	Project Design	..	2	50	..	50
Total		20	10	550	500	1050
<b>ELECTIVE-I</b>						
EB/EE 705 A—Computer Communications						
EE 705 B—High Voltage DC Transmission						
EE 705 C—Neural Network & Fuzzy Logic						
EE 705 D—Optimal Control Theory						
<b>Semester VIII</b>						
EE 801	Electrical Machine Design	4	..	50	100	150
EE 802	Power Systems-III	4	..	50	100	150
EE 803	Electronic Instrumentation	4	..	50	100	150
EE 804	Elective II	4	..	50	100	150
EE 805	Project Work	..	14	300	..	300
EE 806	Viva-voce	..	..	..	100	100
Total		16	14	500	500	1000
Grand Total				3700	4300	8000
<b>ELECTIVE II</b>						
CS/EC/EE/EI 804 A—Digital Image Processing						
EE 804 B—Renewable Sources of Energy						
EE 804 C—Flexible AC Transmission						
EB/EE 804 D—VLSI Design						

## B. TECH INFORMATION TECHNOLOGY

## Scheme for V to VIII Semesters

(2006 Admissions)

Course Code	Subject Name	Hrs. / Week		Internal	University	Marks
		L	T/D/P			Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester V</b>						
CE/CS/EB/EC/EE/ EI/IT/ME/SE 501	Engineering Mathematics IV	4	..	50	100	150
CS/IT 502	Systems Programming	4	..	50	100	150
CS/IT 503	Software Engineering	4	..	50	100	150
IT 504	Computer Graphics and Animation	4	..	50	100	150
CS/IT 505	Database Management Systems	4	..	50	100	150
IT 506	Knowledge Engineering	4	..	50	100	150
IT 507	Mini project-RDBMS Based	..	3	100	..	100
IT 508	Systems Programming lab	..	3	100	..	100
Total		24	6	500	600	1100
<b>Semester VI</b>						
IT 601	Financial Management & E-Banking	4	..	50	100	150
IT 602	Internet programming	4	..	50	100	150
CS/IT 603	Operating Systems	4	..	50	100	150
CS/IT 604	Analysis and Design of Algorithms	4	..	50	100	150
IT 605	Object Oriented Modeling and Design	4	..	50	100	150
CS/IT 606	Computer Networks	4	..	50	100	150
IT 607	Computer Graphics Lab	..	3	100	..	100
IT 608	Mini Project-Internet Based	..	3	100	..	100
Total		24	6	500	600	1100
<b>Semester VII</b>						
CS/EB/EC/EE/ EI/IT 701	Industrial Organization & Management	4	..	50	100	150
IT 702	Multimedia Computing	4	..	50	100	150
CS/IT 703	Advanced Computer Networks	4	..	50	100	150
CS/IT 704	Distributed Computing	4	..	50	100	150
IT 705	Elective I	4	..	50	100	150
IT 706	Computer Network Lab	..	3	100	..	100
IT 707	Mini Project-Multimedia Based	..	3	100	..	100
IT 708	Seminar	..	2	50	..	50
IT 709	Project Design	..	2	50	..	50
Total		20	10	550	500	1050



(1)	(2)	(3)	(4)	(5)	(6)	(7)
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**ELECTIVE I**

IT 705 A—Parallel Computer Architecture &amp; Programming

CS/IT 705 B—Information Retrieval

CS/EB/IT 705 C— Artificial Neural Networks

IT 705 D—Cryptography and Data Security

IT 705 E—Data Mining &amp; Warehousing.

**Semester VIII**

IT 801	Electronic Business and Services	4		50	100	150
IT 802	Real Time Systems	4		50	100	150
IT 803	Software Project Management	4		50	100	150
IT 804	Elective II	4		50	100	150
IT 805	Project Work		14	300		300
IT 806	Viva-voce				100	100
Total		16	14	500	500	1000
Grand Total				3700	4300	8000

**ELECTIVE II**

IT 804 A—Software Testing methods &amp; Tools

CS/EB/EC/IT 804 B—Bioinformatics

IT 804 C— Soft Computing

CS/IT 804 D—Mobile Computing

CS/IT 804 E—Geographical Information Systems.

**B. TECH MECHANICAL ENGINEERING****Scheme for V to VIII Semesters**

(2006 Admissions)

Course Code	Subject Name	Hrs./Week		Marks		
		L	T/D/P	Internal	University	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester V</b>						
CE/CS/EB/EC/EE/Engineering Mathematics IV EI/IT/ME/SE 501		4	..	50	100	150
ME 502	Metrology & Machine Tools	4	..	50	100	150
ME 503	Mechanics of Machinery	4	..	50	100	150
ME 504	Thermal Engineering	4	..	50	100	150
ME 505	Power Plant Engineering	4	..	50	100	150
ME 506	Industrial Management	4	..	50	100	150
ME 507	Hydraulic Machinery Lab	..	3	100	..	100
ME 508	Machine Shop	..	3	100	..	100
Total		24	6	500	600	1100

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester VI</b>						
ME 601	Instrumentation & Control Systems	4		50	100	150
ME 602	Dynamics of Machinery	4		50	100	150
ME 603	Machine Design I	4		50	100	150
ME 604	Heat & Mass Transfer	4		50	100	150
ME 605	Tool Engineering and Design	4		50	100	150
ME 606	CAD-CAM	4		50	100	150
ME 607	Thermal Engineering Lab		3	100		100
ME 608	Metrology & Measurements Lab		3	100		100
Total		24	6	500	600	1100

<b>Semester VII</b>						
ME 701	Operations Research	4		50	100	150
ME 702	Vibration & Noise Control	4		50	100	150
ME 703	Machine Design II	4		50	100	150
ME 704	Refrigeration & Air-Conditioning	4		50	100	150
ME 705	Elective I	4		50	100	150
ME 706	HMT Lab		3	100		100
ME 707	CAD-CAM Lab		3	100		100
ME 708	Seminar		2	50		50
ME 709	Project Design		2	50		50
Total		20	10	550	500	1050

**ELECTIVE I**

- ME 705 A—Aerospace Engineering  
 ME 705 B—Finite Element Method  
 ME 705 C— Advanced Engineering Materials  
 ME 705 D—Quality Engineering.

<b>Semester VIII</b>						
ME 801	Operations Management	5		50	100	150
ME 802	Compressible Fluid Flow	5		50	100	150
ME 803	Production Technology	5		50	100	150
ME 804	Elective II	5		50	100	150
ME 805	Project Work		10	300		300
ME 806	Viva-voce				100	100
Total		20	10	500	500	1000
Grand Total				3700	4300	8000

**ELECTIVE II**

- ME 804 A—Propulsion Engineering  
 ME 804 B—Computational Fluid Dynamics  
 ME 804 C— Material Management  
 ME 804 D—Advanced Production Technology  
 ME 804 E—Automobile Engineering

## B. TECH. DEGREE COURSE IN SAFETY &amp; FIRE ENGINEERING

## Scheme for V to VIII Semesters

(2006 Admissions)

Code No.	Subject	Hrs./Week		Marks		
		L	T/D/P	Internal	University	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester V</b>						
CE/CS/EB/EC/EE/ EI/IT/ME/SE 501	Engineering Mathematics IV	4		50	100	150
SE 502	Chemical Engineering III	4		50	100	150
SE 503	Principles of Engineering Design	4		50	100	150
SE 504	Fire Engineering II	4		50	100	150
SE 505	Principles of Industrial Management	4		50	100	150
SE 506	Safety in Construction	4		50	100	150
SE 507	Safety Engineering Lab	..	3	100	..	100
SE 508	Chemical Engineering Lab	..	3	100	..	100
Total		24	6	500	600	1100
<b>Semester VI</b>						
SE 601	Legal Aspects of Safety, Health and Environment	4		50	100	150
SE 602	Chemical Process Safety	4		50	100	150
SE 603	Process Instrumentation and Control Engineering	4		50	100	150
SE 604	Fire Engineering III	4		50	100	150
SE 605	Environmental Engineering and Management	4		50	100	150
SE 606	Occupational Health & Hygiene Management	4		50	100	150
SE 607	Environmental Engineering & Management Lab	..	3	100	..	100
SE 608	Minor Project	..	3	100	..	100
Total		24	6	500	600	1100
<b>Semester VII</b>						
SE 701	Hazard Identification and Risk Assessment	4		50	100	150
SE 702	Safety in Rail and Road Transport	4		50	100	150
SE 703	Safety in Engineering Industry	4		50	100	150
SE 704	Fire Engineering IV	4	1	50	100	150
SE 705	Elective I	4		50	100	150
SE 706	Fire Engineering Lab	..	3	100	..	100
SE 707	Industrial Hygiene Lab	..	3	100	..	100
SE 708	Seminar	..	3	100	..	100
Total		20	10	550	500	1050

(1)	(2)	(3)	(4)	(5)	(6)	(7)
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## SE 705 ELECTIVE I

A—Automobile Engineering and Safety

B—Safety in Petroleum and Petrochemical Industries

C—Food and Biosafety

D—Fault Detection and Diagnosis.

**Semester VIII**

SE 801	Human Factors Engineering	4	1	50	100	150
SE 802	Disaster Management	5		50	100	150
SE 803	Advanced Safety Engineering and Management	5		50	100	150
SE 804	Elective II	5		50	100	150
SE 805	Project	-	10	300	..	300
SE 806	Viva Voce	-		..	100	100
Total		19	11	500	500	1000
Grand Total				3700	4300	8000

## SE 804 ELECTIVE II

A—Safety in Power Plants

B—Safety in Health-Care Waste Management

C— Fluid Power Safety

D—Total Quality Management.

**B. TECH. ELECTRONICS & INSTRUMENTATION ENGINEERING****Scheme for V to VIII Semesters**

(2006 Admissions)

Course Code	Subject Name	Hrs./Week		Marks		
		L	T/D/P	Internal	University	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester V</b>						
CE/CS/EB/EC/EE/ EI/IT/ME/SE/FT 501	Engineering Mathematics IV	4		50	100	150
EI 502	Industrial Instrumentation I	4		50	100	150
EC/EI 503	Digital System Design	4		50	100	150
EC/EI 504	Advanced Microprocessors	4		50	100	150
EC/EI 505	Micro Electronics & Integrated Circuits	4		50	100	150
EC/EI 506	Digital Signal Processing	4		50	100	150
CS/EB/EC/EI 507	Microprocessor Laboratory	-	3	100	..	100
EI 508	Instrumentation Laboratory I	-	3	100	..	100
Total		24	6	500	600	1100

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester VI</b>						
EI 601	Communication Engineering	4		50	100	150
EI 602	Process Control Instrumentation I	4		50	100	150
EC/EI 603	VLSI Design	4		50	100	150
EI 604	Industrial Instrumentation II	4		50	100	150
CS/EB/EC/EI 605	Control Systems Engineering	4		50	100	150
EC/EI 606	Embedded Systems	4		50	100	150
EI 607	Instrumentation Laboratory II	..	3	100	..	100
EI 608	Mini Project	..	3	100	..	100
Total		24	6	500	600	1100
<b>Semester VII</b>						
CS/EB/EC/EE/ EI/IT 701	Industrial Organization and Management	4		50	100	150
EI 702	Process Control Instrumentation II	4		50	100	150
EC/EI 703	Computer Communication & Networks	4		50	100	150
EI 704	Analytical Instrumentation	4		50	100	150
EI 705	Elective I	4		50	100	150
EC/EI 706	Signal Processing Laboratory	..	3	100	..	100
EI 707	Process Control Laboratory	..	3	100	..	100
EI 708	Seminar	..	2	50	..	50
EI 709	Project Design	..	2	50	..	50
Total		20	10	550	500	1050
<b>ELECTIVE I</b>						
EC/EI 705 A—Intelligent Systems						
EI 705 B—Telemetry and Remote Control						
EI 705 C—Power Plant Instrumentation						
EB/EC/EI 705 D—Mechatronics						
EI 705 E—Artificial Intelligence and Expert Systems						
<b>Semester VIII</b>						
EI 801	Instrumentation System Design	4		50	100	150
EI 802	Biomedical Instrumentation	4		50	100	150
EI 803	Optoelectronic Instrumentation	4		50	100	150
EI 804	Elective II	4		50	100	150
EI 805	Project Work	..	14	300	..	300
EI 806	Viva Voce	..		..	100	100
Total		16	14	500	500	1000
Grand Total				3700	4300	8000

**ELECTIVE II**

CS/EC/EE/EI 804 A—Digital Image Processing  
EI 804 B—Advanced Analytical Techniques  
EC/EI 804 C—ASIC Design  
EI 804 D—Audio and Video Systems  
EI 804 E—Advanced Biomedical Instruments.

## B. TECH. FOOD TECHNOLOGY

(2006 Admission onwards)

For all the practicals from semester I & II to semester VIII, 50% weightage is to be given for continuous evaluation and 50% for end semester examination

Course No.	Subject	Hours/Week		Maximum Marks		Total
		L	T/D/P	Internal	University	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Combined I &amp; II Semesters</b>						
CE/CS/EB/EC/EE/EI/ IT/ME/SE/FT 101	Engineering Mathematics-I	3		50	100	150
CE/CS/EB/EC/EE/EI/ IT/ME/SE/FT 102	Engineering Physics	2		50	100	150
CE/CS/EB/EC/EE/EI/ IT/ME/SE/FT 103	Engineering Chemistry	2		50	100	150
CE/CS/EB/EC/EE/EI/ IT/ME/SE/FT 104	Engineering Mechanics	3	1	50	100	150
CE/CS/EB/EC/EE/EI/ IT/ME/SE/FT 105	Engineering Graphics	1	3	50	100	150
CE/CS/EB/EC/EE/EI/ IT/ME/SE/FT 106	Basic Civil & Mechanical Engineering	2		50	100	150
CE/CS/EB/EC/EE/EI/ IT/ME/SE/FT 107	Basic Electrical Engineering & Electronics	2		50	100	150
CE/CS/EB/EC/EE/EI/ IT/ME/SE/FT 108	Computer Programming	2		50	100	150
CE/CS/EB/EC/EE/EI/ IT/ME/SE/FT 109	Technical Communication & Social Sciences	3		50	100	150
CE/CS/EB/EC/EE/EI/ IT/ME/SE/FT 110	Computer Programming Lab		3	100		100
CE/CS/EB/EC/EE/EI/ IT/ME/SE/FT 111	Electrical and Mechanical Workshops		3	100		100
Total		20	10	650	900	1550
<b>Semester III</b>						
CE/CS/EB/EC/EE/EI/ IT/ME/SE/FT 301	Engineering Mathematics-II	4		50	100	150
FT 302	Physical Chemistry	4		50	100	150
FT 303	Organic Chemistry	4		50	100	150
FT 304	Micro Biology	4		50	100	150
FT 305	Food Chemistry & Nutrition	4		50	100	150
FT 306	Theory of Machines	4		50	100	150
FT 307	Microbiology Laboratory		3	100		100
FT 308	Physical & Organic Chemistry Lab		3	100		100
Total		24	6	500	600	1100

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Semester IV</b>						
CE/CS/EB/EC/EE/EI/ IT/ME/SE/FT 401	Engineering Mathematics III	4		50	100	150
FT 402	Principles of Chemical Engg.	4		50	100	150
FT 403	Biochemistry	4		50	100	150
FT 404	Heat & Mass Transfer	4		50	100	150
FT 405	Unit Operations	4		50	100	150
FT 406	Refrigeration & Cold chain	4		50	100	150
FT 407	Biochemistry Laboratory		3	100		100
FT 408	Unit Operations Laboratory		3	100		100
	Total	24	6	500	600	1100
<b>Semester V</b>						
CE/CS/EB/EC/EE/EI/ IT/ME/SE/FT 501	Engineering Mathematics IV	4		50	100	150
FT 502	Food Microbiology	4		50	100	150
FT 503	Food Additives	4		50	100	150
FT 504	Food Process Engineering	4		50	100	150
FT 505	Dairy Plant Engineering	4		50	100	150
FT 506	Instrumental Methods of Analysis	4		50	100	150
FT 507	Food Microbiology Laboratory		3	100		100
FT 508	Instrumental Methods of Analysis Laboratory		3	100		100
	Total	24	6	500	600	1100
<b>Semester VI</b>						
FT 601	Fruit and Vegetable Processing	4		50	100	150
FT 602	Food Analysis	4		50	100	150
FT 603	Cereals and Legume Technology	4		50	100	150
FT 604	Food Product Development	4		50	100	150
FT 605	Process Plant Equipment and Design	4		50	100	150
FT 606	Fish Processing Technology	4		50	100	150
FT 607	Food Processing Laboratory		3	100		100
FT 608	Food Analysis Laboratory		3	100		100
	Total	24	6	500	600	1100
<b>Semester VII</b>						
FT 701	Food Fermentaion	4		50	100	150
FT 702	Food Preservation	4		50	100	150
FT 703	Food Safety and Hazard Analysis	4		50	100	150
FT 704	Instrumentation & Process Control	4		50	100	150
FT 705	Elective—I*	4		50	100	150
FT 706	Food Preservation Laboratory		3	100		100
FT 707	Engineering Properties Laboratory		3	100		100
FT 708	SEMINAR		2	50		50
FT 709	Project Design		2	50		50
	Total	20	10	550	500	1050

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>ELECTIVE-I</b>						
	FT 705-A—Beverage Processing					
	FT 705-B—Food Packaging Technology					
	FT 705-C—Food Plant Layout and Design					
	FT 705-D—Bakery and Confectionery Technology.					
<b>Semester VIII</b>						
FT 801	Management of Food Processing Industries	4		50	100	150
FT 802	Regulatory Issues in Food Industry	4		50	100	150
FT 803	Meat and Poultry Processing	4		50	100	150
FT 804	Elective—II**	4		50	100	150
FT 805	Project		14	300		300
FT 806	Viva-voce				100	100
Total		16	14	500	500	1000
Grand Total						8000

**ELECTIVE II**

- 804-A—Total Quality Management  
 804-B—Food Biotechnology  
 804-C—Food Industry Waste Management  
 804-D—Enzyme Technology.

(3)

No. Conf.II/2941/1/08 (3).

4th December 2008.

In exercise of the powers conferred by Section 24 (ii) read with Section 42 (1) of the CUSAT Act 1986, (Act 31 of 1986) the Academic Council at its meeting held on 26-3-2008 has resolved to approve the following:

- Introduced a new core paper “Modern Weather Forecasting Technique” in the revised syllabus of M.Sc. Atmospheric Sciences, also introduced 3 new elective papers for M.Sc./M.Tech. Courses:

- Climate change
- Disaster Management and Risk Assessment
- Aviation & Radar Meteorology

[Item I (d) (1) (v) of the Academic Council Minutes]

- Introduced new core papers for M.Sc. Marine Biology:

- Planktonology
- Advanced Marine Biology
- Nanobiotechnology

[Item I (d) (2) (i) of the Academic Council Minutes]



3. Incorporated 5 new elective papers for M.Sc. Marine Biology Course :
  - (a) Bioinformatics
  - (b) Basic Computer Science
  - (c) Biostatistics
  - (d) Marine Geology
  - (e) Basic Meteorology

[Item I (d) (2) (ii) of the Academic Council Minutes]
4. Introduced 2 new electives for M.Sc. Degree Course in Oceanography with effect from 2008 admissions:
  - (a) OCE E19 Marine Remote Sensing Applications
  - (b) OCE E20 Regional Oceanography

[Item No. I (d) 3 (i) of the Academic Council Minutes]
5. Introduced 4 new elective papers for M.Sc. Course in Hydrochemistry:
  - (a) Biogeochemistry of Estuaries & Coastal System
  - (b) Corrosion
  - (c) Chemometrics
  - (d) Water Treatment & Purification

[Item I (d) (4) of the Academic Council Minutes]
6. The existing M.Phil. Course in Chemical Oceanography renamed as 'Marine Chemistry' and also approved the revised scheme of the course as given below:

#### M.PHIL. MARINE CHEMISTRY

##### Scheme—2 Semesters

##### **I Semester**

- |         |                                 |
|---------|---------------------------------|
| Paper 1 | Introduction to Marine Sciences |
| Paper 2 | Marine Analytical Chemistry     |
| Paper 3 | Elective/Guide Paper            |
| Paper 4 | Science Writing                 |

##### **II Semester**

Dissertation

[Item No. I (d) (4) (iii) of the Academic Council Minutes]

7. The Scheme of Examinations of 3 new M.Sc. Programmes to be offered in School of Industrial Fisheries:
  - (a) Sustainable Aquaculture
  - (b) Industrial Fisheries (Fish Processing Technology)
  - (c) Industrial Fisheries Management

[Item No. I (d) (5) of the Academic Council] (Appendix I)

The Syndicate at its meeting held on 20-9-2008 vide item 534.29 approved the above resolutions taken by the Academic Council and (except for Sl. No. 4) made it effective from 20-9-2008 the date of meeting of the Syndicate.

SCHOOL OF INDUSTRIAL FISHERIES  
**M.Sc. Industrial Fisheries (Fish Processing Technology)**

<i>Course Code</i>	<i>Paper</i>	<i>Core/Elective</i>	<i>Credits</i>	<i>Course Teachers</i>	<i>Pre-requisites</i>
(1)	(2)	(3)	(4)	(5)	(6)
<b>Semester I (Theory)</b>					
IFP 5101	Fish Biochemistry	C	3	SM, JM	Graduate in Zoology/ Fishery Science/ Aquaculture/ Industrial Fish & Fisheries
IFP 5102	Fundamentals of fish processing	E	3	JM, SM	do.
IFA 5101	Taxonomy and Life history traits of Fin & shell fishes	E	3	Guest	do.
IFM 5103	Economic Theory for Fisheries Management	E	4	KTT, RK	do.
	Communicative English	E	2	Guest/Dept. of Culture & Heritage	Consent of Course Teacher
	Computer and Mathematical applications	E	2	Guest/Dept. of Computer Studies	Consent of Course Teacher
	Statistics	E	2	Guest/Dept. of Statistics	Consent of Course Teacher
	Entrepreneurship Management	E	2	Guest/School of Management Studies	Consent of Course Teacher
<b>Semester I (Practicals)</b>					
IFP 5110	Fish Biochemistry	C	1	SM, JM	
IFP 5111	Fundamentals of Fish Processing	E	1	JM, SM	
IFA 5104	Taxonomy and Life history traits of Fin & shell fishes	E	1	Guest	
IFM	Fishing operations and fleet management.	E	1	Guest, HK	
<b>Semester II (Theory)</b>					
IFA 5201	Fisheries & Resource Management	E	3	Guest	Course IFA 5101
IFM 5205	Fishing Technology	E	3	HK, Guest faculty	Consent of Teacher
IFP 5201	Food Microbiology & Biotechnology	C	3	Guest JM, SM	Consent of Course Teacher
IFP 5202	Freezing & Refrigeration Technology	C	3	SM, JM	IFP 5101

(1)	(2)	(3)	(4)	(5)	(6)
IFP 5203	Thermal Processing & Packaging	C	3	JM, SM	IFP 5101
IFM 5202	Marketing Management in Fisheries Industry	E	3	MS	Consent of Teacher
IFM 5203	Operations Management	E	3	MS	do.
MBO 2201	Marine Microbiology	E	3	AVS, RP	do.
<b>Semester II (Practical)</b>					
IFA 5205	Fisheries & Resource Management	E	1	Guest	
IFM 5211	Fishing Technology	E	1	HK, Guest faculty	
IFP 5210	Food Microbiology & Biotechnology	C	1	Guest JM, SM	
IFP 5211	Freezing & Refrigeration Technology	C	1	SM, JM	
IFP 5212	Thermal Processing & Packaging	C	1	JM, SM	
IFM	Marketing Management (Field Study)	E	1	MS	
<b>Semester III (Theory)</b>					
IFP 5301	Curing, Dehydration and Value added products	C	4	JM, SM	IFP core subjects in II Semester
IFP 5302	By-products and Speciality Products	C	4	JM, SM	do.
IFP 5303	Instrumental Techniques in Food Product Analysis	C	4	SM, JM, Guest	do.
IFP 5304	Refrigeration Engineering and Design of Processing Plants	E	2	Guest, JM	do.
IFP 5305	Food Laws and Regulations	E	2	Guest	do.
<b>Semester III (Practical)</b>					
IFP 5310	Curing, Dehydration and Value added products	C	2	SM, JM	
IFP 5311	By-products and Speciality Products Practical	C	1	SM, JM	
IFP 5312	Instrumental Techniques in Food Product Analysis	C	2	SM, JM, Guest	
IFP 5313	Refrigeration Engineering and Design of Processing Plants	E	1	Guest, JM	
IFP 5314	Plant visits/Training & Report	C	2	JM, SM	

(1)	(2)	(3)	(4)	(5)	(6)
<b>Semester IV (Theory)</b>					
IFP 5401	Food Safety and Quality Evaluation	C	3	SM, JM, Guest	IFP 5102
IFP 5402	Quality Assurance and Certification	C	3	SM, JM, Guest	Core courses of IFP
IFP 5403	Dissertation	C	8	SM & JM	do.
IFP 5404	In Plant Training & Report	C	4	JM, SM	do.
IFP 5405	Seminar	C	2	All Faculty	do.
IFP 5406	Viva	C	2	All Faculty	do.
<b>Semester IV (Practical)</b>					
IFP 5410	Food Safety and Quality Evaluation	C	1	SM/JM	
IFP 5411	Quality Assurance and Certification	C	1	JM/SM	

*Note:—*

SM—Saleena Mathew

JM—John Mohan

RK—Ramakrishnan Korakandy

KTT—K. T. Thomson

MS—Mini Sekharan

BMK—B. Madhusoodanakurup

HK—M. Harikrishnan

#### DISTRIBUTION OF CREDITS FOR M.Sc. INDUSTRIAL FISHERIES (FISH PROCESSING TECHNOLOGY)

<i>Credits From</i>	<i>Semester</i>				<i>Total</i>
	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	
Core course from the Parent Department	4	12	18	24	58
Elective from Parent Department	4	..	6	..	10
Electives from the School	9	15	..	..	24
Electives from other Schools/Departments	8	6	..	..	14
	25	33	24	24	106

M. Sc. SUSTAINABLE AQUACULTURE  
THEORY PAPERS

**Semester I**

<i>Exam Code</i>	<i>Paper</i>	<i>C/E</i>	<i>Credits</i>	<i>Faculty</i>	<i>Pre-requisites</i>
IFA 5101	Taxonomy and life history traits of fin and shell fishes	C	3	Guest (Post occupied by Dr. Kuruvila Mathew)	SG
IFA 5102	Breeding and seed production of fin fishes	C	3	MK, HK	SG
IFA 5103	Freshwater aquaculture	C	3	HK, MK	SG
IFP 5101	Fish Biochemistry	E	3	SM/JM	SG
IFM 5103	Economic theory for Fisheries Management	E	3	RK/KT	SG
	Fishing operation and Fleet Management	E	3	Prof. Fishing gear (Vacant post)	SG
	Communicative English	E	2		SG
	Computer and Mathematical Application	E	2		SG
	Statistics	E	2		SG
	Entrepreneurship Development	E	2		SG
IFA 5104	Taxonomy and life history traits of fin and shell fishes (Practicals)	C	1	Guest (Post occupied by Dr. Kuruvila Mathew)	SG
IFA 5105	Breeding and seed production of fin fishes (Practicals)	C	1	MK, HK	SG
IFA 5106	Freshwater aquaculture (Practicals)	C	1	HK, MK	SG
IFP 5110	Fish biochemistry (Practicals)	E	1	SM/JM	SG
IFP 5102	Fundamentals of fish processing	E	3	SM/JM	IFP Biochemistry
IFP 5111	Fundamentals of fish preservation (Practicals)	E	1	SM/JM	IFP Biochemistry
IFM 5310	Fishing operation and Fleet Management (Practical)	E	1	Prof. Fishing gear (Vacant)	SG

**Semester II**

<i>Exam Code</i>	<i>Paper</i>	<i>C/E</i>	<i>Credits</i>	<i>Faculty</i>
(1)	(2)	(3)	(4)	(5)
IFA 5201	Fisheries and Resource Management	C	3	Guest (Post occupied by Dr. Kuruvila Mathew)
IFA 5202	Breeding and seed production of shell fishes	C	3	MK, HK
IFA 5203	Fish Genetics and Biotechnology	E	3	HK, MK
IFP 5401	Food safety and quality evaluation	E	3	SM/JM
IFA 5204	Fish and environment	E	3	MK, HK/Guest
IFA 5205	Fisheries and Resource Management (Practicals)	C	1	Guest (Post occupied by Dr. Kuruvila Mathew)
IFA 5206	Breeding and seed production of shell fishes (Practicals)	C	1	MK, HK
IFA 5207	Fish and environment (Practicals)	E	1	MK, HK/Guest
IFP 5410	Food safety and quality evaluation (Practicals)	E	1	SM/JM

(1)	(2)	(3)	(4)	(5)
<b>Semester III</b>				
IFA 5301	Fish nutrition and feed Technology	C	3	HK, MK/Guest
IFA 5302	Brackishwater and coastal aquaculture	C	3	MK, HK
IFA 5303	Aquaculture Engineering	C	3	Guest faculty (Retirement Vacancy)
	Economics of fish production system	E	3	RK/KT
IFA 5304	Fish nutrition and feed Technology (Practicals)	C	1	HK, MK/Guest
IFA 5305	Brackishwater and coastal aquaculture (Practicals)	C	1	MK, HK
IFA 5306	Aquaculture Engineering (Practicals)	C	1	Guest faculty (Post occupied by Dr. Kuruvila Mathew)
<b>Semester IV</b>				
IFA 5401	Sustainable aquaculture production systems	C	2	MK, HK
IFA 5402	Aquaculture and Environmental Management	E	2	Guest (Post occupied by Dr. Kuruvila Mathew)
IFA 5403	Ornamental fish breeding and culture	E	3	HK, MK
IFA 5404	Sustainable aquaculture production systems (Practicals)	C	1	MK, HK
IFA 5405	Aquaculture and Environmental Management	E	1	Guest (Post occupied by Dr. Kuruvila Mathew)
IFA 5406	Ornamental fish breeding and culture (Practical)	E	1	HK, MK

Dissertation-8

Hands on training—Breeding, Farming,  
Feed industry-6

Seminar-1

Viva voce-1

Note:—

MK—Madhusoodana Kurup

HK—Harikrishnan

SM—Saleena Mathew

RK—Ramakrishnan

KT—K. T. Thomson

## CREDITS FOR M.Sc. SUSTAINABLE AQUACULTURE

<i>Semester</i>	<i>I</i>	<i>II</i>	<i>III</i>
Core	12	8	12
EFS	11	8	3
EFCD	0	7	
Total	35	23	15

Core — Core courses offered from the parent Departments

EFS — Electives from same School

EFOS/D — Electives from other School/Departments

EFCD — Electives from Core Departments

SCHOOL OF INDUSTRIAL FISHERIES  
M.Sc. INDUSTRIAL FISHERIES MANAGEMENT

<i>Course Code</i>	<i>Theory Papers</i>	<i>C/E</i>	<i>Credits</i>	<i>Faculty</i>	<i>Pre-requisites</i>
(1)	(2)	(3)	(4)	(5)	(6)
<b>Semester I</b>					
IFM 5101	Fishing Craft Technology	C	3	Guest faculty, HK	Graduate in Fishery Sciences
IFM 5102	Economic theory for Fisheries Management	C	3	KTT, RK	Aquaculture
IFM 5103	Organisation Management	C	3	MS	Industrial Fish & Fisheries
IFA 5101	Taxonomy and life history traits of finfish and shell fish	E	3	BMK, HK	Zoology
IFP 5102	Fundamentals of Fish Processing Technology	E	3	SM, JM	do.
	Communicative English	E	2	Guest faculty/Dept.	do.
	Computer and Mathematical Applications	E	2	Guest faculty/Dept.	do.
	Statistics	E	2	Guest faculty/Dept.	do.
	Entrepreneureship Development	E	2	Guest faculty/Dept.	do.
<b>PRACTICALS/FIELD WORK/CASE STUDIES</b>					
IFM 5110	Fishing Craft Technology	C	1	Guest faculty, HK	Zoology
IFA 5110	Taxonomy and life history traits of finfish and shell fish	E	1	BMK, HK	do.
IFP 5112	Fundamentals of Fish Processing Technology	E	1	SM, JM	do.
IFM 5111	Economic theory for fisheries Management	C	1	KTT, RK	do.
IFM 5112	Seminar on Organisation Management (GD)	C	1	MS	do.
<b>Semester II</b>					
IFM 5201	Fishing Gear Technology	C	3	Guest faculty, HK	IFA 5101
IFM 5202	Economics of Fish Production Systems	C	3	KTT, RK	IFA 5102
IFM 5203	Operations Management in Fisheries	C	3	MS	Consent of teacher
IFM 5204	Marketing Management in Fisheries Industry	C	3	MS	Consent of teacher
IFA 5201	Fisheries and Resource Management	E	3	Guest Faculty	Consent of teacher
IFP 5401	Food Safety and Quality Evaluation	E	3	SM, JM	IFP 5102
IFM 5205	Fishing Technology	E	3	Guest faculty, HK	Consent of teacher
IFM 5206	Aquaculture Economics	E	3	KTT, RK	Consent of teacher
IFM 5207	Economics of Fish Marketing	E	3	RK, KTT	Consent of teacher

(1)	(2)	(3)	(4)	(5)	(6)
PRACTICALS/FIELD WORK/CASE STUDIES					
IFM 5210	Fishing Gear Technology	C	1	Guest faculty, HK	
IFM 5211	Fishing Technology	E	1	Guest faculty, HK	
IFA 5201	Fisheries and Resource Management	E	1	BMK, HK	
IFP 5410	Food Safety and Quality Evaluation	E	1	SM, JM	
IFM 5212	Economics of Fish production Systems	C	1	RK, KTT	
IFM 5213	Operations Management in Fisheries (Case studies)	C	1	MS	
IFM 5214	Marketing Management in Fisheries Industry	C	1	MS	
<b>Semester III</b>					
IFM 5301	Fishing Operations and Fleet Management	C	3	Guest faculty, HK	IFM 5201
IFM 5302	Cost-Benefit Analysis for Fisheries Management	C	3	KTT, Guest faculty	IFA 5202
IFM 5303	Economics of Fisheries Management	C	3	RK, KTT	IFM 5202
IFM 5304	Financial Management for Fish business	C	3	Guest faculty	IFM 5203
IFM 5305	Fisheries and Rural Development	E	3	RK, KTT	Consent of teacher
IFM 5306	Fisheries and Tourism Development	E	3	RK, KTT	Consent of teacher
IFM 5307	Total Quality Management	E	3	MS	Consent of teacher
PRACTICALS/FIELD WORK/CASE STUDIES					
IFM 5310	Fishing Operations and Fleet Management	C	1	Guest faculty, HK	
IFM 5311	Cost-Benefit Analysis for Fisheries Management	C	1	KTT, Guest faculty	
IFM 5312	Economics of Fisheries Management	C	1	RK, KTT	
<b>Semester IV</b>					
IFM 5401	Export Management of Food Fish and Ornamental Fish	C	3	MS	IFM 5303
IFM 5402	Sustainability issues in Fisheries Management	C	3	RK, KTT	Consent of teacher
IFM 5403	Fisheries Governance	C	3	KTT	Consent of teacher
IFM 5404	Disertation	C	6	All faculty	Core courses of IFM
IFM 5405	Seminar	C	1	do.	do.
IFM 5406	Viva voce	C	1	do.	do.



## DISTRIBUTION OF CREDITS FOR M.Sc. INDUSTRIAL FISHERIES MANAGEMENT

<i>Credits From</i>	<i>Semester</i>				<i>Total</i>
	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	
Core course from the Parent Department	12	16	15	17	60
Elective from Parent Department	..	10	9	..	19
Electives from the School	8	8	..	..	16
Electives from other Schools/Departments	8	..	..	..	8
	28	34	24	17	103

*Note:—*

BMK—Madhusoodana Kurup

HK—Harikrishnan

SM—Saleena Mathew

JM—John Mohan

RK—Ramakrishnan

KTT—K. Thomson

MS—Mini Sekharan

(4)

No. Conf. II/2941/1/08 (4).

4th December 2008.

In exercise of the powers conferred by Section 24 (ii) read with Section 42 (1) of the CUSAT Act, 1986 (Act 31 of 1986) the Academic Council at its meeting held on 26-3-2008 resolved to approved the following.

- (1) Modified the eligibility criteria in M. Tech. Electronics/M.Sc. Electronic Science as appended (Appendix I)  
[Item I (e) I (3) of Academic Council Minutes]
- (2) Modified course structure of M. Tech. (Electronics)/M.Sc. Electronic Science as appended. (Appendix II)  
[Item I (e) I (3) of Academic Council Minutes]
- (3) Introduced a paper on Business and Technical Communication at MCA level instead of Communicative English.  
[Item I (e) II (i) of Academic Council Minutes]
- (4) The scheme of Examination of M. Tech. in Computer & Information Science and M. Tech. in Software Engineering as appended. (Appendix III)  
[Item I (e) III (1) of Academic Council Minutes]
- (5) Renamed the B. Tech. Instrumentation Course as B. Tech. Course in Instrumentation Technology and also modified the Regulations and curriculum as appended. (Appendix IV)  
[Item I (e) IV of Academic Council Minutes]
- (6) Renamed the B. Tech. Course in Polymer Science & Rubber Technology as B. Tech. in Polymer Science & Engineering and modified curriculum of the course, with effect from 2008 admission, as appended. (Appendix V)  
[Item I (e) IV (2) of Academic Council Minutes]
- (7) Modified the curriculum of M. Tech. in Polymer Technology with effect from 2008 admissions, as appended. (Appendix VI)  
[Item I (e) IV (2) of Academic Council Minutes]

The Syndicate at its 534th meeting vide item 534.29 approved the resolution of the Academic Council and made these effective from 20-9-2008 the date of meeting of the Syndicate.

## APPENDIX—I

## 1. REVISED ELIGIBILITY CRITERIA FOR M. Sc. (ELECTRONIC SCIENCE).

- (i) First Class B.Sc. degree (with not less than 60% aggregate marks) in Electronics or physics.
- (ii) SC/ST candidates need only have pass minimum for the qualifying Degree.

## 2. REVISED ELIGIBILITY CRITERIA FOR M. TECH. (ELECTRONICS).

- (i) B. Tech. or equivalent degree/AMIE/AMIETE in Electronics and Communication Engineering/Electrical Engineering/Electronic and Instrumentation or M.Sc. Degree in Electronics/Physics (with Electronics as specialization) with a First Class (60%) marks from any recognized University or Institution.
- (ii) A valid GATE score in Electronics/Electronics and Communication Engineering.
- (iii) If sufficient number of candidates are not available in category (ii) above, candidates with GATE score in instrumentation Electrical & Electronics Engineering, Electrical Engineering or Physics will be considered.

In the absence of GATE qualified candidates Non GATE candidates can be admitted on the basis of a Departmental Admission Test (DAT).

## APPENDIX—II

**Course Structure for M. Tech. (Electronics)**

<i>Course Code</i>	<i>Name of the Course</i>	<i>C/E</i>	<i>Credits</i>
(1)	(2)	(3)	(4)
<b>Semester I</b>			
ELE 3101	Microprocessors	C	3
ELE 3102	Advanced Digital Signal Processing	C	3
ELE 3103	Digital Communication	C	3
ELE 3111	Digital Design Engineering	E	3
ELE 3112	VLSI Design	E	3
ELE 3121	Microwave Networks	E	3
ELE 3122	Microwave Devices and Circuits	E	3
ELE 3016L	Microprocessors Laboratory	C	1
ELE 3107L	Digital Signal Processing Laboratory	C	1
ELE 3116L	VLSI Laboratory	E	1
ELE 3126L	Microwave Devices and Circuits Lab.	E	1
Total Credits to be acquire in First Semester			18
<b>Semester II</b>			
ELE 3201	Seminar	C	1
ELE 3202	Neural Networks	C	3
ELE 3203	Fault Tolerant Systems	E	3
ELE 3204	Digital Image Processing	C	3
ELE 3206	Embedded System Design	E	3
ELE 3211	Wireless Mobile Communication	C	3
ELE 3113	ATM Networks	C	3
ELE 3221	Antenna Theory	E	3
ELE 3222	Radar Systems	E	3
ELE 3206L	Digital Image Processing Lab.	C	1
ELE 3216L	Embedded System Design Lab.	E	1
ELE 3217L	Antenna Lab.	E	1
Total Credits to be acquire in Second Semester			18

(1)	(2)	(3)	(4)
<b>Semester III</b>			
ELE 3301	Project Progress Evaluation	C	18
<b>Semester IV</b>			
ELE 3401	Project Dissertation Evaluation	C	18

**Course Structure for M.Sc. Electronics Science**

Course	Name of the Course	C/E	Credit	Curriculum work			Marks		Pre requisites
				per week			Sessional	Uty. Ex.	
				Lect.	Lab.	Tuto.			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
semester I									
ELE 2101	Mathematical and computational Methods	E	3	3	0	2	50	50	B.Sc.(Physics/Electronics/Computer)
ELE 2102	Electronics devices and Circuits	C	3	3	0	2	50	50	B.Sc. (Physics/Electronics/Computer)
ELE 2103	Network Analysis	C	3	3	0	2	50	50	B.Sc. (Physics/Electronics/Computer)
ELE 2104	Digital logic design	C	3	3	0	2	50	50	B.Sc. (Physics/Electronics/Computer)
ELE 2105	Electromagnetics	C	3	3	0	1	50	50	B.Sc. (Physics/Electronics/Computer)
ELE 2101L	Computer Laboratory (Computational methods)	E	2	0	6	0	100	..	B.Sc. (Physics/Electronics/Computer)
ELE 2102L	Electronics devices and Circuits Laboratory	C	2	0	6	0	100	..	B.Sc. (Physics/Electronics/Computer)
Total								19	
Semester II									
ELE 2201	Microprocessor	C	3	3	0	2	50	50	ELE 2103
ELE 2202	Communication Electronics	C	3	3	0	2	50	50	ELE 2101
ELE 2203	Digital Signal Processing	C	3	3	0	2	50	50	B.Sc. (Physics/Electronics/Computer)
ELE 2204	Control Systems	C	3	3	0	2	50	50	B.Sc. (Physics/Electronics/Computer)
ELE 2205	TV & Video Systems	E	3	3	0	1	50	50	ELE 2101
ELE 2208	Robotics-I	E	3	3	0	1	50	50	ELE 2204

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ELE 2209	Microwave Devices	E	3	3	0	1	50	50	B.Sc. (Physics/Electronics/Computer)
ELE 2210	Data Structures	E	3	3	0	1	50	50	B.Sc. (Physics/Electronics/Computer)
ELE 2201L	Microprocessor Laboratory	C	2	0	6	0	100	..	
ELE 2204L	Control Systems Laboratory	C	2	0	6	0	100	..	
								Total	19

## Semester III

ELE 2301	Seminar	C	2	3	0	0	50	50	
ELE 2302	Microprocessor Systems	C	3	3	0	0	50	50	ELE 2201
ELE 2303	Computer networks	C	3	3	0	0	50	50	B.Sc. (Physics/Electronics/Computer)
ELE 2304	Artificial Intelligence	E	3	3	0	0	50	50	ELE 2208
ELE 2305	Robotics-II	E	3	3	0	0	50	50	ELE 2206
ELE 2308	Wave guides and Antennas	E	3	3	0	0	50	50	ELE 2104
ELE 2309	Operating System	E	3	3	0	0	50	50	B.Sc. (Physics/Electronics/Computer)
ELE 2310	Microwave Communication	E	3	3	0	0	50	50	ELE 2104
ELE 2311	Computer Organization	E	3	3	0	0	50	50	B.Sc. (Physics/Electronics/Computer)
ELE 2312	Computer graphics	E	2	3	0	0	50	50	B.Sc. (Physics/Electronics/Computer)
ELE 2302L	Microprocessor Systems Laboratory	C	2	0	8	0	100	..	
ELE 2305L	Robotics Laboratory	E	2	0	8	0	100	..	
ELE 2310L	Microwave Laboratory	E	2	0	8	0	100	..	
ELE 2312L	Computer Laboratory	E	2	0	8	0	100	..	
								Total	18

## Semester IV

Course No.	Name of the Course	C/E	Credit	Curricular work per week			Marks	
				Lect.	Lab.	Tuto.	Sessional	Uty. Ex.
ELE 2401	Project evaluation and Viva voce	C	16	..	16	..	100	200

Credits for Core (C) courses	=	14+16+10+16 = 56
Credits for elective (E) subjects	=	05+03+08+00 = 16
Total Credits for the Course	=	19+19+18+16 = 72

## APPENDIX III

DEPARTMENT OF COMPUTER SCIENCE  
**M. Tech. Computer and Information Science**

<i>Sl. No.</i>	<i>Course Code</i>	<i>Course Title</i>	<i>Core/Elective</i>	<i>Credits</i>	<i>Pre requisites</i>	<i>Syllabus Status</i>
<b>Semester I</b>						
1	CSC 3101	Theory of Computation	C	4		Made as Core
2	CSC 3102	Data Structures and Algorithm Analysis	C	4		Changed
3	CSC 3103	Information Retrieval	C	4		Made as Core
4		Elective I	E	3		
5		Elective II	E	3		
<b>Electives</b>						
		CSC 3104 : Computer Communication & Networking				Changed
		CSC 3105 : Artificial Intelligence & Applications				
		CSC 3106 : Parallel Computer Architecture				
		ISP 3104 : Industrial Management		1	External	
<b>Semester II</b>						
1	CSC 3201	Advanced Database Management	C	4		Changed
2	CSC 3202	Computer Graphics	C	4		Changed
3	CSC 3203	Seminar	C	1		
4		Elective III	E	3		
5		Elective IV	E	3		
6		Elective V	E	3		
<b>Electives</b>						
		CSC 3204 : Operating System Design				
		CSC 3205 : Computational Linguistics			CSC 3105	New Paper
		CSC 3206 : Wireless Networks and Mobile Computing			CSC 3104	New Paper
		ELE 3206 : Embedded System Design			External	
		ELE 3213 : ATM Networks			External	
<b>Semester III</b>						
1	CSC 3301	Project and Viva Voce	C	18		
<b>Semester IV</b>						
1	CSC 3302	Project and Viva Voce	C	18		

DEPARTMENT OF COMPUTER SCIENCE  
**M. Tech. Software Engineering**

<i>Sl. No.</i>	<i>Course Code</i>	<i>Course Title</i>	<i>Core/Elective</i>	<i>Credits</i>	<i>Status</i>	<i>Pre requisites</i>
<b>Semester I</b>						
1	CSS 3101	Software Engineering: Principles	C	4	NC*	
2	CSS 3102	Software Project Management	C	4	NC	
3	CSS 3103	Seminar	C	1		
4		Elective I	E	3		
5		Elective II	E	3		
6		Elective III	E	3		
<b>Electives</b>						
	CSS 3104	: Object Oriented Modelling and Design			NC	
	CSS 3105	: Management and Maintenance of Information Systems			NC	
	CSS 3106	: Human Computer Interaction			NC	
	ELE 3103	: Digital Communication		3	External	
<b>Semester II</b>						
1	CSS 3201	Business Administration and Technical Communication	C	4	NC	
2	CSS 3202	Software Architecture and Designs Patterns	C	4	NC	
3	CSS 3203	Software Quality Management	C	4	NC	
4		Elective III	E	3		
5		Elective IV	E	3		
<b>Electives</b>						
	CSS 3204	: Design of Real Time/Embedded Software			NC	
	CSS 3205	: Agent based Computing			NC	
	CSS 3206	: Internet Technologies			NC	
	ELE 3203	: Fault Tolerant Systems			External	
<b>Semester III</b>						
1	CSS 3301	Project and Viva Voce	C	18		
<b>Semester IV</b>						
1	CSS 3302	Project and Viva Voce	C	18		

\*NC indicates no change

## DEPARTMENT OF INSTRUMENTATION

**Regulations and Curriculum for B. Tech. Degree Course in Instrumentation Technology**

(Effective from 2008-2009 admission onwards)

The existing B. Tech. degree course in Instrumentation is to be re-named as B. Tech. degree course in Instrumentation Technology with the modifications given in this regulation and curriculum.

The B. Tech. Degree Course, in Instrumentation Technology is an eight semester programme, where the first seven semesters include lectures, laboratory work, seminars etc. During the eight semester the students will undergo course work and have to do a project work in an industry/R & D organization or in the department and submit a report on his work. The course structures and scheme of examination are given in clause (5.1) below:

**1. Admission requirements**

Candidates seeking admission to the B. Tech. Degree Course in Instrumentation Technology shall be required to possess the following qualifications.

- 1.1. The candidates shall have passed the plus two (12th) examination of any State/National board with Mathematics, Physics and Chemistry or any other examination accepted as equivalent by the Cochin University of Science and Technology.
- 1.2. The candidate shall have secured a minimum of 60% marks in Mathematics, Physics and Chemistry put together with at least 55% in Mathematics separately.
- 1.3. In the case of candidate belonging to Socially and Educationally Backward Classes [referred to in G. O. (P) 208/660 Edn. dated 2-5-1966, as amended from time to time] the minimum marks requirements are 50% for Mathematics and 55% for Mathematics, Physics and Chemistry put together.
- 1.4. In the case of SC/ST students the minimum requirement is a pass in qualifying examination.
- 1.5. The candidates shall also satisfy the conditions regarding physical fitness as may be prescribed by the University.
- 1.6. Admission to the course shall be through Common Admission Test (CAT) conducted by the University every year and admission will be based on the rank in the admission test. If a candidate, after getting admission based on his/her CAT rank, fails to meet the admission requirement as specified in clause 1.2, 1.3 and 1.4 above before commencement the first semester examination, he/she shall be terminated from continuing the course.
- 1.7. No admission shall be made after 15 working days from the date of commencement of the semester classes.
- 1.8. 10% additional seats may be created in a batch in the third semester for lateral entry candidates seeking admission through lateral entry shall have 3 year diploma in Instrumentation or Electronics with 60% marks. The admission will be based on their rank in admission test conducted by the University. Relaxation in marks applicable for SEBC and SC/ST category shall be followed. Seats fallen vacant during the I semester admission to a batch also may be filled up with lateral entry in third semester.

**2.0. Duration of the course**

- 2.1. The curriculum requirement of B. Tech. Degree shall consist of 4 academic years or 8 Semesters as prescribed in the curriculum.
- 2.2. Examination will be conducted at the end of the Semester in subjects prescribed in the respective scheme of examination.
- 2.3. The teaching programme for each semester shall consist of minimum 16 weeks with 80 working days.

**3.0. Promotion to higher semesters**

- 3.1. A candidate shall be eligible for promotion from one semester to the next semester only if he/she has
  - (a) A valid registration for the University examination.
  - (b) Secured a minimum of 75% attendance.

- 3.2. Supplementary University Examination for all Semesters shall be held along with the regular examinations.
- 3.3. Special supplementary examination may be arranged for the 7th and 8th semesters.
- 3.4. The total number of chances to appear for the examination in any subject is limited to five.

#### 4.0. Eligibility for the Degree

- 4.1. No candidate shall be eligible for the B. Tech. Degree unless he has undergone the prescribed course of study for a period of 8 semesters in the University and has passed the prescribed examinations in all the semesters.
- 4.2. All requirements for degree shall be completed by the candidates within a period of 6 academic years from the date of admission to the first semester.

#### 5.0. Course Structure and Scheme of Examination

- 5.1. The subjects of study and scheme of examinations are given below:

Course	Title of the course	Hours/Week			Credits	Evaluation		
		L	T	P		Int.	Ext.	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>First Semester</b>								
IN 1101	Engineering Mathematics-I	3	1	0	3	50	50	100
IN 1102	Engineering Physics	4	0	0	3	50	50	100
IN 1103	Engineering Chemistry	4	0	0	3	50	50	100
IN 1104	Basic Electronics	4	1	0	4	50	50	100
IN 1105	Electrical Engineering-I	3	1	0	3	50	50	100
IN 1106	Technical Communication	3	0	0	2	50	50	100
IN 1107	Practicals							
	1. Engineering Graphics	0	0	3	2	100	..	100
	2. Mechanical and Electrical Workshop	0	0	3	2	100	..	100
Total		21	3	6	22	500	300	800
<b>Second Semester</b>								
IN 1201	Engineering Mathematics—II	3	1	0	3	50	50	100
IN 1202	Analog Electronics	4	0	0	3	50	50	100
IN 1203	Electrical Engineering -II	4	0	0	3	50	50	100
IN 1204	Engineering Mechanics	4	1	0	4	50	50	100
IN 1205	Material Sciences	3	1	0	3	50	50	100
IN 1206	Ecology and Environmental Science	3	0	0	2	50	50	100
IN 1207	Practicals							
	1. Basic Electronics Lab	0	0	3	2	100	..	100
	2. Computer Programming	0	0	3	2	100	..	100
Total		21	3	6	22	500	300	800



(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Third Semester</b>								
IN 1301	Engineering Mathematics—III	4	1	0	4	50	50	100
IN 1302	Digital Electronics	5	0	0	4	50	50	100
IN 1303	Linear Integrated Circuits	3	1	0	3	50	50	100
IN 1304	Electrical and Electronics Instruments	4	0	0	3	50	50	100
IN 1305	Mechanical Engineering	3	1	0	3	50	50	100
IN 1306	Practicals							
	1. Analog Electronics Lab.	0	0	4	2	125	..	125
	2. Electrical Machines and Measurement Lab.	0	0	4	2	125	..	125
IN 1307	Viva-Voce	..	..	..	1	50	..	50
	Total	19	3	8	22	550	250	800
<b>Fourth Semester</b>								
IN 1401	Engineering Mathematics—IV	3	1	0	3	50	50	100
IN 1402	Principles of Measurement and Instrumentation	4	1	0	4	50	50	100
IN 1403	Control Engineering-I	4	1	0	4	50	50	100
IN 1404	Power Electronics	4	0	0	3	50	50	100
IN 1405	Pneumatic and Hydraulic System	4	0	0	3	50	50	100
IN 1406	Practicals							
	1. Digital Electronics Lab	0	0	4	2	125	..	125
	2. Material Science Lab	0	0	4	2	125	..	125
IN 1407	Viva-Voce	..	..	..	1	50	..	50
	Total	19	3	8	22	550	250	800
<b>Fifth Semester</b>								
IN 1501	Control Engineering-II	4	1	0	4	50	50	100
IN 1502	Transducers and Industrial Instrumentation-I	4	1	0	4	50	50	100
IN 1503	Microprocessors and Applications	3	1	0	3	50	50	100
IN 1504	Analytical Instruments	4	0	0	3	50	50	100
IN 1505	Digital Instruments	4	0	0	3	50	50	100
IN 1506	Practicals							
	1. Control System Lab	0	0	4	2	125	..	125
	2. Transducers Lab	0	0	4	2	125	..	125
IN 1507	Viva-Voce	..	..	..	1	50	..	50
	Total	19	3	8	22	500	250	800

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Sixth Semester</b>								
IN 1601	Transducers and Industrial Instrumentation-II	4	1	0	4	50	50	100
IN 1602	Signals and systems	4	0	0	3	50	50	100
IN 1603	Optoelectronic Instrumentation	4	1	0	3	50	50	100
IN 1604	Process Control-I	4	0	0	4	50	50	100
IN 1605	Engineering Management	4	0	0	3	50	50	100
IN 1606	Practicals							
	1. Micro Processor and Micron roller Lab	0	0	4	2	125	..	125
	2. Industrial Instrumentation	0	0	4	2	125	..	125
IN 1607	Viva-voce	..	..	..	1	50	..	50
	Total	20	2	8	22	500	500	800
<b>Seventh Semester</b>								
IN 1701	Bio-Medical Instrumentation	4	0	0	3	50	50	100
IN 1702	Process Control-II	4	1	0	4	50	50	100
IN 1703	Power Plant Instrumentation	4	0	0	3	50	50	100
IN 1704	Telemetry and remote Control	4	0	0	3	50	50	100
IN 1705	Elective-I	4	0	0	3	50	50	100
IN 1706	Practicals							
	Process Control Lab	0	0	6	3	150	..	150
IN 1707	Mini Project	0	0	2	1	50	..	50
IN 1708	Seminar	0	..	1	1	50	..	50
IN 1709	Viva-Voce	..	..	..	1	50	..	50
	Total	20	1	9	22	550	250	800
<b>Eighth Semester</b>								
IN 1801	Vacuum and Cryogenic Instrumentation	4	0	0	3	50	50	100
IN 1802	Microcontroller and Microcomputer based Instrumentation	4	0	0	3	50	50	100
IN 1803	Elective II	4	0	0	3	50	50	100
IN 1804	Comprehensive Viva-voce	0	0	0	2	100	..	100
IN 1805	Project							
	1. Project work	0	0	18	9	100	200	300
	2. Project Viva-voce	0	0	0	2	50	50	100
	Total	12	0	18	22	400	400	800
	Total for Eighth Semester	151	18	71	176	4250	2150	6400

## ELECTIVES

1. Aero space and Navigational Instrumentation
  2. Adaptive control and learning systems
  3. Digital signal processing
  4. Advanced analytical instruments
  5. Environmental monitoring instruments
  6. Robotics and expert systems
  7. Process dynamics
  8. Nonlinear control systems
  9. Chemical plant instrumentation
  10. Reliability and Safety Engineering
  11. Advanced biomedical instruments
  12. Non destructive evaluation of materials
  13. MEMS and Microsystems
- 5.2. At the end of each semester every candidate shall register for the examination.
- 5.3. A candidate who does not register for the examination at the end of a semester shall not be promoted to the next semester.
- 5.4. Conduct of Examinations
- The examination in theory papers shall be conducted as per the time table notified by the university in each semester.
- 5.5. The project work during the 8th semester may be done either in an industry/R & D establishment outside the department or within the department.
- 6.0. **Rules Regarding Attendance**
- 6.1. Every candidate is required to secure a minimum of 75% attendance in aggregate to be eligible to appear for the University Examination.
- 6.2. Candidates having shortage of attendance upto a limit of 10% are eligible to seek condonation by applying in the prescribed procedure.
- 6.3. A student cannot avail condonation for more than two times during the entire duration of the course.
- 6.4. It shall be open to the Vice-Chancellor to grant condonation of shortage in attendance upto 10% on the recommendation of the Head of the Department
- 6.5. Those who are having shortage of attendance and not eligible for condonation shall repeat the respective semester at the next available chance, and meet the minimum requirement
- 7.0. **Rules Regarding Sessional Marks**
- 7.1. The total sessional marks of 50 for each theory subject shall be made of 35 for internal tests 10 for assignments and 5 for attendance. One mark each will be awarded for every 5% of attendance over and above the minimum required i.e. 75%. However the teachers, depending upon the specific requirements of the subject, can make minor changes in the distribution with the permission of the Head of the Department.
- 7.2. For the laboratory courses 50% of marks are to be awarded based on the regular performance of the student in the laboratory. The remaining marks are to be awarded based on the evaluation at the end of the semester conducted by the Faculty in charge of the laboratory and another teacher nominated by the head of the Department.
- 7.3. A student can repeat a semester/year only once. This shall be subject to clause 4.2.

### 8.0. Rules for Readmission

- 8.1. Students who are unable to attend classes on medical or other genuine grounds may be readmitted to the respective semesters along with the subsequent batch.
- 8.2. A student seeking readmission shall give a written application to the Head of the Department, thirty days prior to the commencement of the semester to which readmission is sought.
- 8.3. Students who have been removed from the nominal rolls due to default in payment of the Semester fees shall be readmitted subject to the following conditions.
- 8.4. The Head of the Department can readmit the student within 15 days from the last date of payment of the semester fees.
- 8.5. Thereafter sanction for readmission may be accorded by the University.
- 8.6. Readmission can be given only if the student can secure a minimum of 75% attendance in aggregate meeting the eligibility criterion to register for the University examination of the respective semester.

### 9.0. Pass Requirements and Classification of Successful Candidates

- 9.1. A candidate who secures not less than 40% marks in a subject at the University Examinations and 50% aggregate marks in the University Examination and sessional marks put together shall be declared to have passed in the examination in that subject. In subjects where there are no university examinations a candidate shall secure 50% sessional marks for a pass in that subject.
- 9.2. Credit system will be followed in classifying the candidates. Based on the overall performance in a course at the end of a semester, letter grades will be assigned on the following scheme.

95 per cent and above	E	10
90 per cent and above	EA	9
80 per cent and above	A	8
70 per cent and above	B	7
60 per cent and above	C	6
50 per cent and above	D	5
Less than 50 Per cent	Fail	0

The performance at the end of semester will be indicated by the Grade Point Average (GP A) calculated as follows:

$$\text{GPA} = \frac{G_1 C_1 + G_2 C_2 + G_3 C_3 + \dots + G_n C_n}{C_1 + C_2 + C_3 + \dots + C_n}$$

Where 'G' refer to the grade weight and 'C' s refer to the credit value of the course underwent by the student (Credit values are given in the curriculum).

At the end of the 8th semester, a Cumulative Grade point Average (CGPA) will be calculated based on the above formula.

A student will qualify for the B.Tech. degree with the following classification :

CGPA 8 and above	:	1st class with distinction
CGPA 6 and above	:	1st Class
CGPA 5 and above	:	2nd class

Ranking will be made on the basis of CGPA. In case of a tie the percentage marks will be considered for a decision.

- 9.3. In the case of lateral entry students calculation of CGPA, finalization result and classification shall be made based on the 6 semesters attended by the students.

**10.0. Revision of Curriculum**

- 10.1. The University may from time to time revise, amend or change the regulations, scheme of examinations and syllabi.
- 10.2. In the case of students already undergoing the course the changes will take effect from the beginning of the following semester after the changes are introduced and shall be applicable to the part of the course that remains to be completed, unless otherwise decided.
- 10.3. Whenever there is a changes in the existing scheme of examinations, the University examinations based on the old scheme/syllabi will be conducted for two more academic years only.

**11. Fees**

The Fee structure for the course will be decided by the University and will be announced at the time of application. The fees for the first semester will be payable at the time of admission and for subsequent semesters, on or before the fifth working day after reopening of each semester.

**12. Number of Seats**

The total number of seats, including reserved ones, shall be 28. The University may change this number depending on availability of facilities.

**13. Application procedures**

Candidates seeking admission to the course may apply in the prescribed form to register for the Common Admission Test conducted by the University every year paying the necessary fees. The pattern and mode of CAT will be decided by the University and will be notified while inviting applications.

## APPENDIX—V

## B. TECH. DEGREE COURSE IN POLYMER SCIENCE AND ENGINEERING

Sl. No.	Course code	Subject	L	T	P	Credits	Marks		
							Internal	External	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>Semester I</b>									
1	PE 1101	Engineering Mathematics I	3	1	0	3	50	50	100
2	PE 1102	Engineering Physics	3	1	0	3	50	50	100
3	PE 1103	Engineering Chemistry	3	1	0	3	50	50	100
4	PE 1104	Engineering Graphics	2	3	0	4	50	50	100
5	PE 1105	Basic Electrical Engineering and Electronics	3	1	0	3	50	50	100
6	PE 1106	Technical Communication	2	1	0	2	50	50	100
7	PE 1107	Mechanical Workshop	0	0	3	2	100	-	100
8	PE 1108	Basic Electrical and Electronics Lab	0	0	3	2	100	-	100
Total			16	8	6	22	500	300	800
<b>Semester II</b>									
1	PE 1201	Engineering Mathematics II	3	1	0	3	50	50	100
2	PE 1202	Engineering Mechanics	4	1	0	4	50	50	100
3	PE 1203	Ecology and Environment	2	1	0	3	50	50	100
4	PE 1204	Mechanical Engineering	3	1	0	3	50	50	100
5	PE 1205	Introduction to Macromolecular Science and Engineering	3	1	0	3	50	50	100
6	PE 1206	Physical and Inorganic Chemistry	3	1	0	2	50	50	100
7	PE 1207	Computer Programming	0	1	2	2	100	-	100
8	PE 1208	Introduction to Chemical Analysis	0	0	3	2	100	-	100
Total			18	7	5	22	500	300	800

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>Semester III</b>									
1	PE 1301	Engineering Mathematics III	3	1	0	3	50	50	100
2	PE 1302	Fluid Mechanics	3	1	0	3	50	50	100
3	PE 1303	Natural Rubber Production and Technology	3	1	0	3	50	50	100
4	PE 1304	Strength of Materials	3	1	0	3	50	50	100
5	PE 1305	Heat and Mass Transfer	3	1	0	3	50	50	100
6	PE 1306	Organic Chemistry	3	1	0	3	50	50	100
7	PE 1307	Industrial Chemical Analysis	0	0	3	2	100	-	100
8	PE 1308	Identification of Polymers	0	0	3	2	100	-	100
Total			18	6	6	22	500	300	800
<b>Semester IV</b>									
1	PE 1401	Applied Statistics	3	1	0	3	50	50	100
2	PE 1402	Quality Systems and Safety	3	1	0	3	50	50	100
3	PE 1403	Polymer Synthesis and Manufacture	3	1	0	3	50	50	100
4	PE 1404	Science and Engineering of Rubbers	3	1	0	3	50	50	100
5	PE 1405	Thermodynamics and Reaction Engineering	3	1	0	3	50	50	100
6	PE 1406	Plastic Materials	3	1	0	3	50	50	100
7	PE 1407	Polymer Synthesis	0	0	3	2	100	-	100
8	PE 1408	Chemical Engineering Lab	0	0	3	2	100	-	100
Total			18	6	6	22	500	300	800
<b>Semester V</b>									
1	PE 1501	Plastics Processing	3	1	0	3	50	50	100
2	PE 1502	Polymer Physics	3	1	0	3	50	50	100
3	PE 1503	Polymer Rheology	3	1	0	3	50	50	100
4	PE 1504	Rubber Processing and Products Manufacture	3	1	0	3	50	50	100
5	PE 1505	Fiber Science and Technology	3	1	0	3	50	50	100
6	PE 1506	Adhesives and Surface Coatings	3	1	0	3	50	50	100
7	PE 1507	Polymer Characterization and Properties	0	0	3	2	100	-	100
8	PE 1508	Polymer Processing	0	0	2	1	50	-	50
9	PE 1509	Review Seminar	0	0	1	1	50	-	50
Total			18	6	6	22	500	300	800

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>Semester VI</b>									
1	PE 1601	Latex Technology	3	1	0	3	50	50	100
2	PE 1602	Characterisation and Testing Methods	3	1	0	3	50	50	100
3	PE 1603	Polymer Products Design	3	1	0	3	50	50	100
4	PE 1604	Polymer Composites and Blends	3	1	0	3	50	50	100
5	PE 1605	Polymers for Electrical & Electronics Applications	3	1	0	3	50	50	100
6	PE 1606	Elective I	3	1	0	3	50	50	100
7	PE 1607	Minor Project and Seminar	0	0	3	2	100	-	100
8	PE 1608	Latex Technology Practical	0	0	3	2	100	-	100
Total			18	6	6	22	500	300	800
<b>Semester VII</b>									
1	PE 1701	Polymers and Environment	3	1	0	3	50	50	100
2	PE 1702	Introduction to Mould and Die Design	3	1	0	3	50	50	100
3	PE 1703	Strength and Failure	3	1	0	3	50	50	100
4	PE 1704	Industrial Management	3	1	0	3	50	50	100
5	PE 1705	Tyre Technology	3	1	0	3	50	50	100
6	PE 1706	Elective II	3	1	0	3	50	50	100
7	PE 1707	Polymer Product Testing	0	0	3	2	100	-	100
8	PE 1708	Elective Based Seminar	0	0	3	2	100	-	100
Total			18	6	6	22	500	300	800
<b>Semester VIII</b>									
1	PE 1801	Project Work Report and Viva Voce	0	0	15	12	300	200	500
2	PE 1802	Industrial Training	0	0	15	10	200	100	300
Total			0	0	30	22	500	300	800
<b>ELECTIVES</b>									
	PE 1606	A. Polymers for Packaging B. Polymer Process Modeling and Simulation C. Polymers for Biomedical Applications	3	1	0	3	50	50	100
	PE 1706	A. Polymers in Space B. Polymer Nanocomposites and their Applications C. CAD/CAM in Polymer Processing	3	1	0	3	50	50	100
Grand Total			176				6400		

APPENDIX—VI  
M. TECH. POLYMER TECHNOLOGY

<i>Sl. No.</i>	<i>Sem</i>	<i>Name of the Subject</i>	<i>Core/ Elective</i>	<i>L</i>	<i>P</i>	<i>C</i>
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	POL 6101	Advanced Polymer Science	C	3	0	3
2	POL 6102	Applied Mathematics	C	3	0	3
3	POL 6103	Operational Management & Management Information Systems	C	2	0	2
4	POL 6104	Polymer Materials	C	2	0	2
5	POL 6105	Rubber Processing & Product Manufacture	C	2	0	2
6	POL 6106	Polymers for Bio medical Applications /Polymers for Packaging/Speciality Polymers/Chemical Engineering/Material Science	E	3	0	3
7	POL 6107	Polymer Technology	C	0	2	2
8	POL 6108	Review Seminar	C	0	1	1
Total Credit						18
1	POL 6201	Plastics Processing	C	3	0	3
2	POL 6202	Advanced Polymer Rheology	C	3	0	3
3	POL 6203	Polymer Product Design	C	3	0	3
4	POL 6204	Characterisation and Testing	C	3	0	3
5	POL 6205	Die Mould and Design	C	2	0	2
6	POL 6206	Tyre Technology/Polymers in Space Applications/Polymers in Electrical and Electronics Applications/Polymer nano composites	E	3	0	3
7	POL 6207	Polymer Technology II	C	0	1	1
Total Credit						18
1	POL 6301	Project Work Report and Viva Voce	0	0	18	18
2	POL 6401	Project Work Report and Viva Voce	0	0	18	18



Conf. II/2941/1/08/(5).

4th December 2008.

In exercise of the powers conferred by Section 24 (ii) read with Section 42 (1) of the CUSAT Act, 1986 (Act 31 of 1986) the Academic Council at its meeting held on 26-3-2008 resolved to approve the following.

- (1) Renamed the M.Sc. Ariborne Warfare Management and Electronic Systems offered at Observer School, under Southern Naval Command as M.Sc. Degree Course in Air Operations Management, also approved the course structures of the Courses (Regular and Lateral Entry) and made them effective from 2005 admission.  
(Item I (e) VII (1&2) of Academic Council Minutes) Appendix 1.
- (2) Regulation and course structure of M. Sc. Degree Course in Diving Technology (Lateral Entry)  
(Item I (e) VII (3) of Academic Council Minutes) Appendix II.
- (3) Regulation and course structure of Diploma in Diving Technology  
(Item I (e) VII (4) of Academic Council Minutes) Appendix III.

The Syndicate at its 534th meeting held on 20-9-2008 approved the above resolutions taken by the Academic Council and made it effective from 20-9-2008 (except for item at SI No. 1, the date of effect is as mentioned against the item).

#### APPENDIX—I

##### REGULATIONS: AIR OPERATIONS MANAGEMENT (REGULAR)

- |   |    |   |
|---|----|---|
| 1. Programme No.                            | .. | 4301  |
| 2. Programme Name                           | .. | M. Sc. (Air Operations Management)  |
| 3. Programme Code                           | .. | Observer  |
| 4. Approving Authority                      | .. | Naval Headquarters  |
| 5. Eligibility criteria for Admission       | .. | (a) Officer nominated by Naval Headquarters<br>(b) A B.Sc. Degree in any discipline from any recognised University.   |
| 6. Duration                                 | .. | (a) Semester I & II would consist of cadet phase and Slt. Technical Course (60 weeks)<br>(b) Semester III & IV will be Air Operations Management course (44 weeks)<br>(Total Duration 2 years as required for M.Sc. degree) |
| 7. Attendance Required                      | .. | 80% Minimum   |
| 8. Nature                                   | .. | Full Time   |
| 9. Approved intake capacity                 | .. | As Approved by Naval Headquarters   |
| 10. Examination Pattern                     | .. | Exam Paper setter would be other than Subject Instructor as nominated by CI   |
| (a) 12 Written Papers                       | .. | 950   |
| (b) 06 Flying training exams                | .. | 1000  |
| (c) Project and book review                 | .. | 50  |
| 11. Minimum Qualifying Marks                | .. | 60%   |
| (a) Aggregate Marks                         | .. | 60%   |
| (b) Written Examination                     | .. | 50% [Except Airmanship (80%) due to Flight Safety Management]   |
| (c) Flying                                  | .. | 60%   |
| (d) Individual book review and Project work | .. | 55%   |

**12. Grading :**

(a) *Grades*—The following are the grades for performance in individual subject:

<i>Range of Marks</i>	<i>Grades</i>	<i>Weightage</i>
90% and above	S Outstanding	10
80-90%	A Excellent	9
70-80%	B Very Good	8
60-70%	C Good	7
50-60%	D Satisfactory	6
Below 50%	F Failure	0

(b) *Cumulative Grade Point Average*—Over all performance at the end of the course is indicated by Cumulative Grade Point Average (CGPA) calculated as for the subjects:

$$CGPA = \frac{G1C1 + G2C2 + G3C3 + \dots + GnCn}{C1 + C2 + C3 + \dots + Cn}$$

Where G=Grade Weightage

C= Corresponding Subject Credit

(c) The classification on degree would be as follows:

<i>Sl. No.</i>	<i>Classification</i>	<i>CGPA</i>
1	First class with distinction	8 and above
2	First class	7 and above
3	Second and above	6 and above

**13. Details of course and credit points are as follows:**

<i>Course Code</i>	<i>Subjects/Flying</i>	<i>C/E</i>	<i>Credits</i>
(1)	(2)	(3)	(4)
<b>Semester III</b>			
23.01	Anti Submarine Warfare-I	C	4
23.02	Anti Submarine Warfare-II	C	4
23.03	Naval Oceanology and Meteorology	C	4
23.04	Aeronautical Science and Technology	C	4
23.05	Electronic Warfare and Submarine Tactics	C	4
23.06	Gunnery and Photography	C	2
23.07	Radio aids	C	4
23.08	Basic stage flying and preparation-I	C	4
23.09	Basic stage flying and preparation-II	C	4
23.10	Basic stage flying and preparation-III	C	4
Total			38

(1)	(2)	(3)	(4)
<b>Semester IV</b>			
24.01	Air Navigation-I	C	4
24.02	Air Navigation-II		
24.03	Airmanship	C	4
24.04	Instruments and Magnetism	C	4
24.05	Air Operations and Tactics	C	4
24.06	Projects and Book Reviews	C	4
24.07	Advance stage flying and preparation-I	C	4
24.08	Advance stage flying and preparation-II	C	4
24.09	Advance stage flying and preparation-III	C	4
Total			36

#### 14. Failure in Examination

- (a) In case of failure of any subject, the pupil officer would be given a written warning and would be examined again. In case a pupil fails again, he would be recommended for withdrawal.

OR

- (b) In case a pupil fails in two or more subjects he would be recommended for withdrawal.

OR

- (c) In case a pupil fails in two consecutive sorties he would be given a written warning and would be taken up for a check sortie by the Chief Instructor. In case pupil fails in Check Sortie he would be taken up for a suspension check sortie by the Officer-in-charge. If the pupil officer fails in this sortie also, he would be recommended for withdrawal from the course. A pupil can be given maximum of two check sortie by the Chief Instructor.

#### SCHEME OF INSTRUCTION AND EXAMINATION M.Sc. IN AIR OPERATIONS MANAGEMENT (REGULAR)

##### PROGRAMME No. 4301

Course Code	Subject/Flying	Total Hours	Credits	Scheme of Teaching			Scheme of Examination Marks			
				L	P	T/P HR	TH	P	O	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
<b>Semester III</b>										
23.01	Anti Submarine Warfare-I	70	4	60	10	04	75	..	..	75
23.02	Anti Submarine Warfare-II	60	4	60	..	03	75	..	..	75
23.03	Naval Oceanology & Meteorology	70	4	60	10	03	50	..	..	50
23.04	Aeronautical Science and Technology	110	4	70	40	03	50	..	..	50
23.05	Electronic Warfare & Submarine Tactics	70	4	60	10	04	50	..	..	50
23.06	Gunnery & Photography	35	2	35	..	04	50	..	..	50
23.07	Radio aids	60	4	60	..	03	150	..	..	150
23.08	Basic stage flying & Preparation-I	70	4	60	10	04	..	100	50	150
23.09	Basic stage flying & Preparation-II	70	4	60	10	04	..	100	50	150
23.10	Basic stage flying & Preparation-III	75	4	60	15	04	..	150	50	200
Total		690	38	585	105	..	500	350	150	1000

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
<b>Semester IV</b>										
24.01	Air Navigation-I	100	4	70	30	4.5	75	..	..	75
24.02	Air Navigation-II	60	4	60	..	3	75	..	..	75
24.03	Airmanship	60	4	60	..	3	100	..	..	100
24.04	Instruments & Magnetism	60	4	60	..	4	150	..	..	150
24.05	Air Operations and Tactics	60	4	60	..	3	50	..	..	50
24.06	Projects & Book reviews	75	4	60	15	4	..	50	..	50
24.07	Advance stage flying & Preparation-I	70	4	60	10	4	..	100	50	150
24.08	Advance stage flying & Preparation-II	70	4	60	10	4	..	100	50	150
24.09	Advance stage flying & Preparation-III	75	4	60	15	4	..	150	50	200
Total Marks		630	36	550	80	..	450	400	150	1000

## REGULATIONS: AIR OPERATIONS MANAGEMENT (LATERAL)

- |     |                                    |    |   |
|-----|------------------------------------|----|---|
| 1.  | Programme No.                      | .. | 4302  |
| 2.  | Programme Name                     | .. | M.Sc. (Air Operations Management)   |
| 3.  | Programme Code                     | .. | Observer (LATERAL ENTRY)  |
| 4.  | Approving Authority                | .. | Naval Headquarters  |
| 5.  | Eligibility Admission Criteria for | .. | (a) Qualified Observer Course<br>(b) B.Sc. degree in any discipline from any recognised University  |
| 6.  | Duration                           | .. | (a) Semester I & II would consist of cadet phase and SLT Technical Course (60 Weeks)<br>(b) Semester III & IV would be Air Operations Management Course (44 Weeks)<br>(Total Duration 2 years as required for M. Sc. degree)                            |
| 7.  | Attendance Required                | .. | 80% Minimum   |
| 8.  | Nature                             | .. | (a) Selected candidates are to formally registered beginning of IV Semester of M. Sc. (Air Operations Management) and join with the regular batch.<br>(b) Selected candidates are to qualify the IV Semester examinations along with the regular batch. |
| 9.  | Approved intake capacity           | .. | As approved by HQSNC.   |
| 10. | Examination Pattern                | .. | Examination Paper setter would be other than Subject Instructor as nominated by CI  |
|     | (a) 12 Written Papers              | .. | 950   |
|     | (b) 06 Flying training exams       | .. | 1000  |
|     | (c) Dissertation                   | .. | 250   |

11. Minimum Qualifying Marks .. 60%
- (a) Aggregate Marks .. 60%
- (b) Written Examination .. 50% [Except Airmanship (80%) due to Flight safety Management]
- (c) Flying .. 60%
- (d) Dissertation .. 55%

12. **Grading :**

- (a) *Grades.*—The following are the grades for performance in individual subject.

<i>Range of Marks</i>	<i>Grades</i>	<i>Weightage</i>
90% and above	S Outstanding	10
80-90%	A Excellent	9
70-80%	B Very Good	8
60-70%	C Good	7
50-60%	D Satisfactory	6
Below 50%	F Failure	0

- (b) *Cumulative Grade Point Average.*—Over all performance at the end of the course is indicated by Cumulative Grade point Average (CGPA) calculated as for the subjects.

$$CGPA = \frac{G1C1 + G2C2 + G3C3 + \dots + GnCn}{C1 + C2 + C3 + \dots + Cn}$$

Where G=Grade Weightage

C=Corresponding Subject Credit.

- (c) The classification on degree would be as follows:

<i>Sl. No.</i>	<i>Classification</i>	<i>CGPA</i>
1	First class with distinction	8 and above
2	First Class	7 and above
3	Second and above	6 and above

**13. Details of course and credit points are as follows:**

<i>Course Code</i>	<i>Subjects/Flying</i>	<i>C/E</i>	<i>Credits</i>
(1)	(2)	(3)	(4)
<b>Semester- III</b>			
23.01	Anti Submarine Warfare-I	C	4
23.02	Anti Submarine Warfare-II	C	4
23.03	Naval Oceanology & Meteorology	C	4
23.04	Aeronautical Science and Technology	C	4
23.05	Electronic Warfare & Submarine Tactics	C	4
23.06	Gunnery & Photography	C	2
23.07	Radio aids	C	4
23.08	Basic stage flying & Preparation-I	C	4
23.09	Basic stage flying & Preparation-II	C	4
23.10	Basic stage flying & Preparation-III	C	4
Total			38

(1)	(2)	(3)	(4)
<b>Semester-IV</b>			
24.01	Air Navigation-I	C	4
24.02	Air Navigation-II		4
24.03	Airmanship	C	4
24.04	Instruments & Magnetism	C	4
24.05	Air Operations and Tactics	C	4
24.06	Advance stage flying & Preparation-I	C	4
24.07	Advance stage flying & Preparation-II	C	4
24.08	Advance stage flying & Preparation-III	C	4
24.09	Dissertation	C	4
Total			36

Note:—

- (a) Marks for subjects from 23.01 to 23.10 would be from Observes School Examination mark list of candidates.
- (b) Examinations for Subjects from 24.01 to 24.08 would be conducted at school, officers enrolled for lateral entry have to appear in all examinations.
- (c) Subject 24.09 would be for preparation and presentation of dissertation and would be evaluated out of 250 marks.

#### 14. Failure in Examination

The candidate failing to get the necessary grade in examinations shall be deemed to have failed in the examination.

#### SCHEME OF INSTRUCTION AND EXAMINATION M. Sc. IN AIR OPERATIONS MANAGEMENT (LATERAL) PROGRAMME No. 4302

Course Code	Subject/Flying	Total Hours	Credits	Scheme of Teaching			Scheme of Examination Marks			
				L	P	T/P HR	TH	P	O	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
<b>Semester-III</b>										
23.01	Anti Submarine Warfare-I	70	4	60	10	04	75	..	..	75
23.02	Anti Submarine Warfare-II	60	4	60	..	03	75	..	..	75
23.03	Naval Oceanology & Meteorology	70	4	60	10	03	50	..	..	50
23.04	Aeronautical Science and Technology	110	4	70	40	03	50	..	..	50
23.05	Electronic Warfare & Submarine Tactics	70	4	60	10	04	50	..	..	50
23.06	Gunnery & Photography	35	2	35	..	04	50	..	..	50
23.07	Radio aids	60	4	60	..	03	150	..	..	150
23.08	Basic stage flying & Preparation-I	70	4	60	10	04	..	100	50	150
23.09	Basic stage flying & Preparation-II	70	4	60	10	04	..	100	50	150
23.10	Basic stage flying & Preparation-III	75	4	60	15	04	..	150	50	200
Total		690	38	585	105	..	500	350	150	1000

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
<b>Semester-IV</b>										
24.01	Air Navigation-I	100	4	70	30	4.5	75	..	..	75
24.02	Air Navigation-II	60	4	60	..	3	75	..	..	75
24.03	Airmanship	60	4	60	..	3	100	..	..	100
24.04	Instruments & Magnetism	60	4	60	..	4	150	..	..	150
24.05	Air Operations and Tactics	60	4	60	..	3	50	..	..	50
24.06	Advance stage flying & Preparation-I	70	4	60	10	4	..	100	50	150
24.07	Advance stage flying & Preparation-II	70	4	60	10	4	..	100	50	150
24.08	Advance stage flying & Preparation-III	75	4	60	15	4	..	150	50	200
24.09	Dissertation	75	4	60	15	4	150	100	..	250
Total Marks		630	36	550	80	..	600	450	150	1200

## APPENDIX-II

## REGULATIONS: CLEARANCE DIVING OFFICER (LATERAL)

1.	Programme No.	..	8102
2.	Programme Name	..	M.Sc. (Diving Technology)
3.	Programme Code	..	Clearance Diving Officer Course (Lateral Entry)
4.	Approving Authority	..	Naval Headquarters
5.	Eligibility Criteria for Admission	..	(a) Officer nominated by Naval Headquarters (b) A. B.Sc. degree in any discipline from any recognised University
6.	Duration	..	(a) Semester I & II will consist of cadet phase and Slt technical phase (60 Weeks) (b) Semester III & IV will be Clearance Diving Officer course (44 Weeks) (Total Duration 2 years as required for M.Sc. degree)
7.	Attendance Required	..	80% Minimum
8.	Nature	..	(a) Selected candidates are to formally register at the beginning of IV Semester of M.Sc. (Diving Technology) and join with the regular batch. (b) Selected candidates are to qualify the IV Semester examinations along with the regular batch.
9.	Approved intake capacity	..	As approved by Naval Headquarters
10.	Examination Pattern	..	Examination Paper setter would be other than Subject Instructor as nominated by Chief Instructor (CI)
	(a) 14 Written Exams	..	1250 Marks
	(b) 09 Practical	..	650 Marks
	(c) Dissertation	..	300 Marks
11.	Minimum Qualifying	..	60% Marks

12. **Grading:**(a) *Grades.*—The following are the grades for performance in individual subject.

<i>Range of Marks</i>	<i>Grades</i>	<i>Weightage</i>
90% and above	S Outstanding	10
80-90%	A Excellent	9
70-80%	B Very Good	8
60-70%	C Good	7
50-60%	D Satisfactory	6
Below 50%	F Failure	0

(b) *Cumulative Grade Point Average.*—Over all performance at the end of the course is indicated by Cumulative grade point Average (CGPA) calculated as for the subjects.

$$\text{CGPA} = \frac{G1C1 + G2C2 + G3C3 + \dots + G_n C_n}{C1 + C2 + C3 + \dots + C_n}$$

Where G=Grade Weightage

C=Corresponding Subject Credit.

(c) The classification on degree would be as follows:

<i>Sl. No.</i>	<i>Classification</i>	<i>CGPA</i>
1	First class with distinction	8 and above
2	First Class	7 and above
3	Second and above	6 and above

13. **Details of course and credit points are as follows:**

<i>Subject Code</i>	<i>Paper</i>	<i>Credits</i>
(1)	(2)	(3)
<b>Semester III</b>		
23.01	Physics of Diving	4
23.02	Diving Physiology	4
23.03	Explosive Ordnance Disposal & Mine Clearance	4
23.04	Mixture Theory	4
23.05	Non Destructive Testing	4
23.06	RCC & Construction of Diving System	4
23.07	Demolition	4
23.08	Marine Salvage	4
23.09	Clearance Diving General	4
Total		36



(1)	(2)	(3)
<b>Semester IV</b>		
24.01	Hull Maintenance	4
24.02	Deep & Saturation Diving	4
24.03	Diving Medicine	4
24.04	Submarine Familiarisation and Escape Training	4
24.05	Diving Equipments	4
24.06	Dissertation	4
24.07	Physical Training	4
24.08	Diving Practical	4
24.09	On Job Training at Operational Diving Teams/Units	4
Total		36

Note:—

- Marks for subjects from 23.01 to 23.09 would be from Diving School Examination mark list of candidates.
- Examinations for subjects from 24.01 to 24.09 would be conducted at school All Officers enrolled for lateral entry have to appear in all examinations.
- Subject 24.06 would be for preparation and presentation of dissertation and would be evaluated out of 300 marks.

#### 14. Failure in Examination

The candidate failing to get the necessary grade in examinations shall be deemed to have failed in the examination.

#### SCHEME OF INSTRUCTION AND EXAMINATION

##### M.Sc. IN DIVING TECHNOLOGY (LATERAL)

##### PROGRAMME No. 8102

Subject Code	Subject	Total Hours	Credits	Scheme of Teaching			Scheme of Examination Marks		
				L (HR)	P (HR)	T/P (HR)	TH	P	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>Semester III</b>									
23.01	Phycsis of Diving	70	4	56	14	3	50	..	50
23.02	Diving Physiology	70	4	56	14	3	50	..	50
23.03	Explosive Oridnance Disposal & Mine Clearance	70	4	56	14	3	100	..	100
23.04	Mixture Theory	65	4	50	15	4	50	50	100
23.05	Non-Destructive Testing	70	4	60	10	5	100	50	150
23.06	RCC & Construction of Diving System	65	4	45	20	4	50	50	100
23.07	Demolition	70	4	50	20	5	100	50	150
23.08	Marine Salvage	70	4	50	20	5	100	50	150
23.09	Clearance Diving General	70	4	50	20	5	100	50	150
Total		620	36	473	147	..	700	300	1000

Note:— L — Theory (Hours)  
P — Practical (Hours)  
T/P — Theory/Practical Examination (Hours)  
TH — Theory Marks

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>Semester- IV</b>									
24.01	Hull Maintenance	65	4	55	10	3	100	..	100
24.02	Deep & Saturation Diving	65	4	55	10	3	100	..	100
24.03	Diving Medicine	65	4	55	10	3	100	..	100
24.04	Submarine Familiarisation and Escape Training	65	4	55	10	4	100	..	100
24.05	Diving Equipment	70	4	50	20	5	150	..	150
24.06	Dissertation	70	4	30	40	3	300	..	300
24.07	Physical Training	70	4	10	60	2	..	100	100
24.08	Diving Practical	70	4	10	60	5	..	150	150
24.09	On Job Training at Operational Diving Teams/Units	70	4	15	55	3	..	100	100
Total		610	36	335	275	..	850	350	1200

## APPENDIX-III

## REGULATION

1.	Programme No.	..	8103
2.	Programme Name	..	Diploma in Diving Technology
3.	Programme Code	..	Petty Officers (Clearance Diver)
4.	Approving Authority	..	Headquarters, Southern Naval Command
5.	Eligibility Criteria for Admission	..	(a) Nomination by Naval Headquarters, Commodore, Bureau of Sailors (b) Matriculation with minimum 55% aggregate marks (c) Should have qualified Leading Board. (d) Should have minimum seven years of service experience. This is to be certified by the Head of the School after verifying from service documents.
6.	Duration of the Course	..	58 Weeks (25 weeks basic Orientation Course, 12 weeks sea training, 13 weeks PO CDI 'Q' & 08 weeks on Job Training)
7.	Attendance Requirement	..	80% minimum (Trainee remaining absent for more than 15% of the duration of the course is to be withdrawn with prior approval of HQSNC)
8.	Nature	..	Full time
9.	Approve intake capacity	..	As approved by HQSNC
10.	Examination Pattern	..	Question paper setter and evaluator will be other than the subject instructor as nominated by Training Design and Evaluation Cell. The teaching staff of this school will evaluate 100% of the answer sheets and result will be forwarded to the University on completion of the course. Examination pattern will be as follows:
	(a) 06 Theory exams	..	500 Marks
	(b) 11 Practical exams	..	650 Marks
Total		..	<u>1150 Marks</u>

11. Minimum Qualifying marks .. (a) Written Examination — 55%  
(b) Practical — 55%
12. *Grading.*—The grading of the students is base on the final result, as mentioned below:—
- (a) 80% and above .. O—Outstanding  
(b) 75-79.99% .. A—Distinction  
(c) 70-74.99% .. B—Above average  
(d) 65-69.99% .. C—High average  
(e) 60-64.99% .. D—Average  
(f) 55-59.99% .. E—Below Average  
(g) Below 55% .. F—Failure
13. *Failure in Examinations.*—These will be governed by the Training Directives issued by the Headquarters, Southern Naval Command and are amplified herein under:—
- (a) Trainee failure in any one paper will be warned by the Chief Instructor and re-examined.  
(b) Trainee failing in more than one paper or more once in one paper will be warned by the Officer-in-charge and re-examined.  
(c) Trainee may be retained in the School for the purpose of self-study/extra classes and re-examination, for a period not exceeding two weeks.  
(d) Trainee who fails to qualify in the re-examination as at Para 13 (b) above or absent from the course by 15% of the duration of the course is liable to be withdrawn from the course.  
(e) Marks obtained in re-examination will be restricted to minimum pass marks for that subject.

DIPLOMA IN DIVING TECHNOLOGY  
PROGRAMME No. 8103  
SCHEME OF TEACHING AND EXAMINATION

Subject Code	Subject Hours	Total	Scheme of Teaching (Per week in hours)		Scheme of Examination			
			L	P	Duration of TH/P (Hrs)	Marks		
						T	P	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
03.01.01	Diving Theory	25	5	..	3	100	..	100
03.01.02	Marine Salvage	50	5	5	3	50	50	100
03.01.03	Demolition Theory	25	2	3	4	50	50	100
03.01.04	Equipment	25	5	..	3	100	..	100
03.01.05	Mine Clearance	25	5	5	4	100	50	150
03.01.06	Clearance Diving General	25	5	..	3	100	..	100
03.01.07	Task Book recording	10	..	1	1	..	50	50
03.01.08	Practical supervision of Recompression Chamber	10	..	5	1	..	50	50
03.01.09	Practical Clandestine Operations	50	..	10	2	..	50	50

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
03.01.10	Personal Physical conditioning	48	..	4	1	..	100	100
03.01.11	Diving at high altitudes	25	..	25	2	..	50	50
03.01.12	Open Water Diving	10	..	5	2	..	50	50
03.01.13	Search & Rescue diving & Combat Beach Reconnaissance	10	..	5	2	..	50	50
03.01.14	Supervisory skills evaluation	15	..	5	2	..	100	100
Total						500	650	1150

(6)

No. Conf. II/2941/1/08.

13th February 2009.

In exercise of the powers conferred by Section 24 (ii) read with Section 42 (1) of the CUSAT Act 1986 (Act 31 of 1986), the Academic Council at its Meeting held on 26-3-2008 vide Item No. I (6) (b) of the Academic Council Minutes resolved to approve 100% Internal Evaluation for all M.Phil. Degree Courses including setting up of question papers and that the M. Phil. thesis be evaluated by an External Expert and Internal Expert.

The Syndicate at its Meeting held on 30-12-2008 vide Item No. 537.10 approved to implement the above resolution of the Academic Council.

(7)

No. Conf. II/2941/1/08 (28).

23rd June 2009.

The Academic Council at its Meeting held on 26-3-2008 in exercise of the powers conferred by Section 24 (ii) read with Section 42(1) of CUSAT Act 1986 (Act 31 of 1986) resolved the following:

1. To change the nomenclature of Master of International Business (MIB) to MBA (International Business) from 2009 admission onwards [Item No. I (K) (2) of the Academic Council Minutes].
2. To include ITI Certificates in addition to the approved Plus Two/CBSE Certificates in the Entry Qualification for First Level Courses in Foreign Languages [Item No. I (J) (2) (5) of the Academic Council Minutes].

The Vice-Chancellor approved the above decision taken by the Academic Council invoking the powers of Syndicate, under Section 11(11) of CUSAT Act 1986, [U.O.(2) Nos. issued vide Conf.II/2941/1/08 dated 17-12-2008] subject to reporting the matter to the Syndicate.

The Syndicate at its Meeting held on 1-4-2009 vide Item No. 541.27 resolved to ratify the action taken by the Vice-Chancellor and made these resolutions effective from 1-4-2009 (the date of Meeting of the Syndicate).

No. Conf. II/2941/1/08 (29).

18th June 2009.

In exercise of the powers conferred by Section 24 (ii) read with Section 42 (1) of CUSAT Act 1986, (Act 31 of 1986) the Academic Council at its meeting held on 26-3-2008 resolved to approve the following:

1. Modified curriculum for M.Sc. Environmental Technology. Appendix I [Vide Item I (a) of the Academic Council Minutes].
2. Modified the Regulations and Incorporation of Grading Format in the Scheme of Examinations for M.Sc. Under Water Armament, Sonar Systems and Tactical Operations Prog. No. 8803. Appendix II [Vide Item No.I (e) VII of the Academic Council Minutes].

The Syndicate at its meeting held on 1-4-2009 vide Item No. 541.45 resolved to approve the above decision taken by the Academic Council and made them effective for 2008-09 Academic year.

## REGULATIONS LONG ASW

- |     |                                    |    |  |
|-----|------------------------------------|----|--|
| 1.  | Programme No.                      | .. | 8803   |
| 2.  | Programme Name Civil Equal         | .. | M.Sc. Under Water Armament, Sonar Systems and Tactical operations  |
| 3.  | Programme Code Naval Equal         | .. | LASW   |
| 4.  | Approving Authority                | .. | Naval Headquarters   |
| 5.  | Eligibility Criteria for Admission | .. | (a) Officer nominated by Naval Headquarters<br>(b) A Degree in P/C/M or equivalent from a recognized University  |
| 6.  | Duration                           | .. | Semester I & II<br>(a) 50 weeks technical training after B.Sc. degree.<br>(b) Minimum of 6 weeks of on job training.<br><br>Semester III & IV<br>48 weeks specialisation training at ASW school, (total duration is 2 years as required for M.Sc. programme) |
| 7.  | Attendance requirement             | .. | 80% minimum  |
| 8.  | Nature                             | .. | Full Time  |
| 9.  | Approved intake capacity           | .. | As approved by HQSNC   |
| 10. | Examination Pattern                | .. | Exam paper setter will be other than the Subject Instructor as nominated by CI.  |
|     | 13 Written Pappers                 |    | 1600 Marks   |
|     | 5 Practical Exams                  |    | 100 Marks  |
|     | Project work                       |    | 200 Marks  |
|     | End of Term Board                  |    | 100 Marks  |
|     | Total                              |    | 2000 Marks   |
| 11. | <b>Minimum Qualifying Marks</b>    |    |  |
|     | (a) Aggregate Marks                | .. | 55%  |
|     | (b) Written Examination            | .. | 50%  |
|     | (c) Practical                      | .. | 65%  |
|     | (d) Project Work                   | .. | 55%  |

12. **Grading**

(a) *Grades.*— The following are the grades for performance in individual subject.

<i>Range of Marks</i>	<i>Grades</i>	<i>Weightage</i>
90% and above	S Outstanding	10
80-90%	A Excellent	9
70-80%	B Very Good	8
60-70%	C Good	7
50-60%	D Satisfactory	6
Below 50%	F Failure	0

(b) *Cumulative Grade Point Average.* —Overall performance at the end of the course is indicated by Cumulative Grade point average (CGPA) calculated as follows for all subjects:-

$$CGPA = \frac{G_1 C_1 + G_2 C_2 + G_3 C_3 + \dots + G_n C_n}{C_1 + C_2 + C_3 + \dots + C_n} \quad (G = \text{Grade weightage and } C = \text{Corresponding subject})$$

(c) The Classification on degree would be as follows:—

<i>Classification</i>	<i>CGPA</i>
First Class with distinction	8 and above
First Class	7 and above
Second Class	6 and above

(d) Details of the course and credit points are as follows:—

<i>Course Code</i>	<i>Paper</i>	<i>C/E</i>	<i>Credit</i>	<i>Faculty</i>
ASW 23.01	Under Water acoustics	C	4	VRH
ASW 23.02	Digital Electronics	C	2	BKR
ASW 23.03	Applied Mathematics	C	3	AKS
ASW 23.04	Computer Networking	C	4	(External faculties)
ASW 23.05	Sonar Theory	C	5	SR
ASW 23.06	Naval Weapon Systems	C	5	SSR/CPS
ASW 23.07	Lofar	C	4	AJK
ASW 23.08	Rocket Launchers	C	2	KSV
ASW 23.09	Torpedos	C	3	MMT/PKV
<b>Semester IV</b>				
ASW 24.01	Under Water Sensors	C	2	AJK
ASW 24.02	Mine and Mine Counter Measures	C	4	AK
ASW 24.03	Tactics	C	20	AJK/CPS/SSR/MMT/ AK/EXT Ft
ASW 24.04	GASW/Seaward Defence/ Demolition	C	3	RM/SM
ASW 24.05	Project Work	C	8	AKJ/TC/CI
ASW 24.06	End of Term Board	C	8	TC/CI

### 13. Failure in Examination

(a) The following will entail withdrawal from Course:-

(i) Major Subjects: .. Failure in two major subjects. (<100marks Major subjects)

OR

(ii) Major and Minor Subjects: .. Failure in a combination of one major subject and two minor subjects.

OR

(iii) Minor Subjects: .. Failure in three minor subjects.(>100 marks Minor subjects)

(b) Re-Examination

- (i) Trainees who fail in one minor subject are to be warned by the Chief Instructor. Those who fail in one major subject or more than one minor subjects are to be warned by the Officer-in-Charge.
- (ii) Trainees who fail in one major subject/one major and one minor subject/two minor subjects are to be re-examined after giving them at least one week notice and extra coaching if required.
- (iii) Failure in re-examination in any major subject would entail withdrawal from course. Failure in re-examination in a minor subject would add to the aggregate of failure in minor subjects and actions that ensue should conform to Para (ii) above. No trainee is however eligible for re-exam in the same subject more than twice. Failure in second re-exam for the same minor subject would entail withdrawal.
- (iv) Project work is to be considered as one of the major subject to attain the Long Course qualification. Failure in it would attract penalties as enumerated in Para (ii) above.

#### SCHEME OF INSTRUCTIONS & EXAMINATION

M.Sc. COURSE IN UNDER WATER ARMAMENT, SONAR SYSTEMS AND TACTICAL OPERATIONS PROGRAMME  
No. 8803 (LONG ASW COURSE)

Sub code	Subject	Total Hrs.	Credit	Scheme of Teaching			Scheme of Examination			Marks Total
				L	P	Dur. of T/P Hrs.	TH	P	O	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
<b>Semester III</b>										
23.01	Under Water Acoustics	60	04	56	4	4	150	..	..	150
23.02	Digital Electronics	30	02	29	1	1.5	50	..	..	50
23.03	Applied Mathematics	50	03	50	..	3	100	..	..	100
23.04	Computer Networking	80	04	55	25	1.5	50	..	..	50
23.05	Sonar Theory	120	05	80	40	4	150	..	..	150
23.06	Naval Weapon Systems	70	04	50	20	4	175	25	..	200
23.07	Lofar	60	04	45	15	1.5	40	..	..	50
23.08	Rocket Launchers	30	02	20	10	3	80	..	..	100
23.09	Torpedos	55	03	40	15	4	125	25	..	150

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
<b>Semester IV</b>										
24.01	Under Water Sensors	25	02	20	5	3	100	..	..	100
24.02	Mine and Mine Counter Measures	60	04	45	15	4	150	..	..	150
24.03	Tactics	350	20	320	30	6	350	..	..	350
24.04	GASW/Seaward Defence/ Demolition	40	02	30	10	3	80	20	..	100
24.05	Project Work	140	08	140	..	14	..	..	50	200
24.06	End of Term Board	150	08	150	..	3	..	..	100	100
Total Marks		1320 Hrs.	..	..	..	..	..	..	..	2000
		(48 Weeks)								

## MODIFIED CURRICULUM FOR M.Sc. ENVIRONMENTAL TECHNOLOGY

<b>Semester I</b>				
<i>Course Code</i>	<i>Paper</i>	<i>C/E</i>	<i>Credits</i>	
(1)	(2)	(3)	(4)	
ENV 2101	Environmental Biology	C	3	
ENV 2102	Chemistry of the Environment	C	3	
ENV 2103	Physical Processes in the Environment	C	3	
ENV 2104	Environmental Microbiology	C	3	
ENV 2105	Environmental Chemistry Lab	C	2	
ENV 2106	Environmental Microbiology Lab	C	2	
ENV 2107	Environmental Physics & Geology Lab	E	1	
ENV 2108	Chemometrics & Good Laboratory Practices	E	2	
Theory:				
Core	-	12		
Electives	-	2		
Practicals:				
Core	-	4		
Electives	-	1		
Total	-	19		



(1)	(2)	(3)	(4)
<b>Semester II</b>			
ENV 2201	Advanced Methods in Environmental Analysis	C	2
ENV 2202	Environmental Engineering	C	3
ENV 2203	Environmental Toxicology	C	3
ENV 2204	Environmental Management and Law	E	3
ENV 2205	Environmental Engineering Lab	C	2
ENV 2206	Chemical Methods in Environmental Analysis Lab	C	2
ENV 2207	Environmental Toxicology & Biochemistry Lab	C	1
ENV 2208	Environmental Modeling	E	2
ENV 2209	Flow and Particle Mechanics	C	2
Theory:			
Core	-	10	
Electives	-	5	
Practicals:			
Core	-	5	
Total	-	20	
<b>Semester III—Stream-I</b>			
ENV 2301	Principles of Chemical Engineering	C	2
ENV 2302	Unit Operations and Processes in Water and Wastewater Treatment	C	3
ENV 2303	Fundamental Engineering Designs and Drawings	C	3
ENV 2304	Geo-informatics and Resource Management	E	3
ENV 2305	Solid Waste Treatment and Air Quality Management	C	2
ENV 2306	Water Treatment Technology	E	2
ENV 2307	Environmental Engineering Designs and Drawings Lab-1	C	2
ENV 2308	Environmental Engineering and Management Lab-2	C	3
Theory:			
Core	-	10	
Electives	-	5	
Practicals:			
Core	-	5	
Total	-	20	

(1)	(2)	(3)	(4)
<b>Semester III—Stream-2</b>			
EMB 2301	Applied Environmental Microbiology	E	3
EMB 2302	Environmental Biotechnology	C	3
EMB 2303	Eco-Toxicology	C	3
EMB 2304	Biodiversity and Conservation	C	3
EMB 2305	Bioremediation	C	3
EMB 2306	Microbial Technology Lab	C	2
EMB 2307	Eco-Toxicology Lab	C	1
EMB 2308	Ecology and Biodiversity Lab	E	2

Theory:

Core	-	12
Electives	-	3

Practical:

Core	-	3
Electives	-	2
Total	-	20

**Semester IV**

ENV 2401	Project (Major)	C	14
ENV 2402	EIA-Case study-Report and Viva Voce Examination (Internal)	E	2

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Total 16

**Overall Credits :****Stream I**

Core	-	60
Electives	-	15

**Stream 2**

Core	-	60
Electives	-	15

Cochin University P. O.,  
Kochi-22.

(Sd.)  
Registrar.